

# GEO TIMES

Professional News Magazine



**Nov.-Dec. 1960**

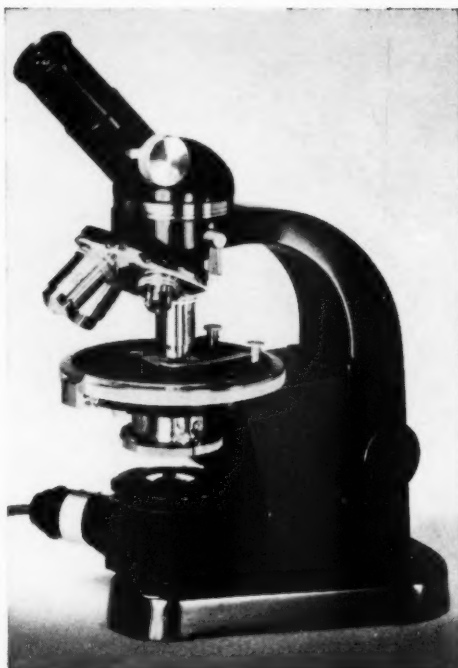
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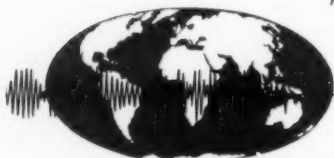
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# Calendar

Cooperation of Society Secretaries in supplying meeting notices for GEOTIMES calendar is requested.

Dec. 2-3, 1960—N.A.G.T., Texas Sect.—Texas Acad. of Sci.; Texas Christian Univ. Campus, Fort Worth, Texas.

Dec. 26-31, 1960—AAAS, Annual Meeting, New York City.

## 1961

Jan. 23-26, 1961—AMER. METEOROLOGICAL SOC., Ann. meeting, joint with Inst. Aerospace Sci. and N.Y. Acad. Sci. Write: Hdqtrs.

Feb. 8-10, 1961—CANADIAN INST. OF SURV. & PHOTOGRAMMETRY, Ann. Meeting, Ottawa, Ont.

Feb. 10, 1961—12th ANN. SYMPOSIUM ON HIGHWAY GEOLOGY, University of Tennessee, Knoxville; Write: R. A. Laurence, USGS, Room 11, P. O. Bldg., Knoxville 2, Tenn.

Feb. 26-Mar. 2, 1961—AIME: Ann. Meeting, Chase and Park Plaza Hotels, St. Louis.

Mar. 5-10—ASP-ACSM: Annual Meeting, Shoreham Hotel, Washington, D. C.

Mar. 21-30—AMER. CHEM. SOC., 139th Meeting, St. Louis, Mo.

Mar. 20-24—SEVENTH NUCLEAR CONGRESS, Chicago, Ill.

Mar. 27-28, 1961—SSA: Ann. Meeting, in conjunction with GSA, Cordilleran Section, San Diego State College, San Diego, Calif. Write: Karl V. Steinbrugge, 465 California Street, San Francisco 4.

April—OHIO ACAD. OF SCIENCE, Geol. Sect., Univ. of Cincinnati, Ohio.

\*April 13-15, 1961—GSA: SE SECTION Ann. meeting, Andrew Johnson Hotel, Knoxville, Tenn. Sponsored by Univ. of Tenn. and Tenn. Division of Geology. Papers—2 days, field trips—1 day. Write: Harry J. Klepper, Dept. of Geology, Univ. of Tenn., Knoxville.

April 17-19—CIM: Annual General Meeting, Chateau Frontenac, Quebec City, Quebec.

April 20-21, 1961—AIME: Soc. of Petrol. Eng., East Texas-Lou.-Ark., gas technology symposium, Tyler, Texas.

April 23-27—ACerS: 63rd Annual Meeting, Royal York Hotel, Toronto, Ontario.

April 24-25, 1961—AIME: Southwest Mineral Industry Conf., Las Vegas, Nevada.

April 24-27—AAPG-SEPM: 46th Ann. Meeting, Hilton Hotel, Denver, Colo.

April 27-29, 1961—6th ANN. INST. OF LAKE SUPERIOR GEOLOGY, Port Arthur, Ont., Canada. Write: E. R. Mead, 213 Park Street, Port Arthur.

May 4-5, 1961—AIME: Soc. of Petrol. Eng., oil recovery conf., Midland, Texas.

May 11-13, 1961—GSA: Rocky Mountain Sect. meeting, Laramie, Wyo.

May 25-26—AIME: Joint Meeting Rocky Mountain Petroleum Sects., Salt Lake City, Utah.

## GEOTIMES CALENDAR

Meeting notices for the GeoTimes Calendar should be submitted in concisely edited form to:

Mrs. Kathryn Lohman  
GeoTimes Calendar Editor  
2101 Constitution Ave., N.W.  
Washington 25, D.C.

## 1960 SCHEDULE OF FIELD TRIPS

For additional field trips held in conjunction with meetings, see those items marked with an asterisk under meeting calendar.

Dec. 2-3—TEXAS ACAD. OF SCIENCE, no details.

Dec. 9-11—SOUTH TEXAS GEOL. SOC., trip to Medina and Val Verde Counties to study Cretaceous sediments with emphasis on Edwards and Glen Rose. Write: Porter Montgomery, Milam Bldg., San Antonio, Tex. Guidebook.

## 1961

April 15—ILLINOIS STATE GEOL. SURV., trip to Mississippian strata and glaciation evidences of the Sparta region, Randolph County, Ill.

May 5-7—GEOLOGIC FIELD CONF., 10th Annual, on Stratigraphy of the Silurian rocks of Northern Indiana, Indiana Geological Survey joint with Dept. of Geology, Indiana University, Spencer Hotel, Marion, Ind. Write: H. R. Shaver, Chrmn., Geol. Survey, Bloomington, Ind.

May 6—ILLINOIS STATE GEOL. SURV., trip to study Mississippian formations and to collect geodes and fossils in the Hamilton region, Hancock County, Ill.

May 20—ILLINOIS STATE GEOL. SURV., trip to Mazon Creek and Braidwood plant fossil collecting areas, quarries and outcrops of Morris area, Grundy County, Ill.

Aug. 25-26—FRIENDS OF THE PLEISTOCENE, Rocky Mountain Section, 7th Ann. Field Conf., Bear Lake-American Falls, Ida. Write for inf. and reservations: J. Stewart Williams, Utah State U., Logan.

## FIELD TRIP CALENDAR

Most of the information regarding field trips in this calendar appears through the courtesy and cooperation of the AAPG Field Trip Committee. Corrections, additions and new trip notices should be sent to George H. Fentress, Chairman, AAPG Field Trip Committee, P. O. Box 2585, Denver 1, Colo., with a carbon copy to GeoTimes Calendar, American Geological Institute, 2101 Constitution Ave., N.W., Washington 25, D. C.

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# This Month in GEOTIMES



Professional News Magazine

Published by **THE AMERICAN GEOLOGICAL INSTITUTE**

Robert C. Stephenson,  
EDITOR

Kathryn Lohman,  
CIRCULATION MANAGER

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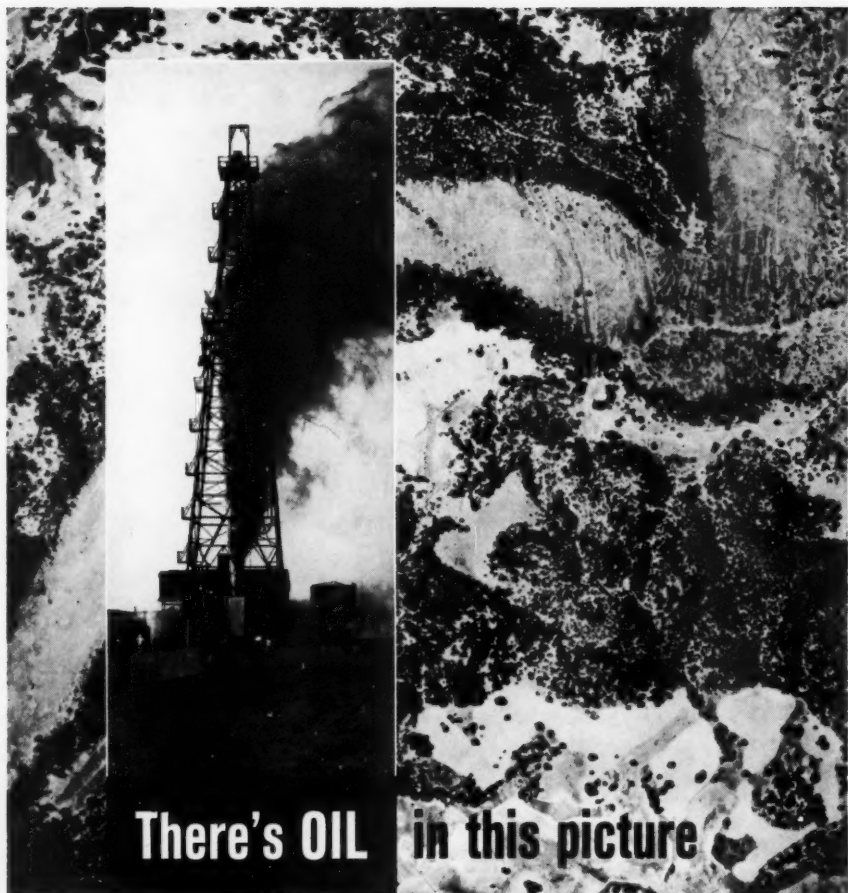
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*John F. Kennedy, Feb. 7, 1960*

POCATELLO, IDAHO "The hard facts of the matter are that today we do not have that kind of research and development program in atomic energy—and neither do we have them in mineral resources. The National Science [Foundation] Advisory Committee on Mineral Research has recommended intensive studies into new techniques of mineral discovery—to find new ways of locating and reaching the immense wealth which lies beneath a covering of sediments throughout the western states. Our methods of exploring mineral deposits on the surface, or near the surface, are no longer sufficient—particularly if we are to compete with foreign producers working in richer deposits of high grade ore." *John F. Kennedy, Sept. 6, 1960.*

BILLINGS, MONT. "But I am not satisfied to discuss the subject of resource development in this campaign, in terms of future generalities and past performance. For this is not only a major issue in this campaign—it is a major element of national strength. And the American people have a right to hear not only our goals, but how we intend to reach them—not only our principles, but how we intend to apply them—not only our rhetoric, but the deeds we plan to match our words. . . . we will establish a Council of Resources and Conservation Advisors in the Office of the President, to coordinate planning in this field. We have had too many short-term, limited, piecemeal studies. We have not had enough long-range, continuing and comprehensive surveys. We need a permanent inventory of where we stand today and what we will need tomorrow, in water, power, timber, recreation, and other resources. We need a rational schedule of action, instead of hit-or-miss development that depends upon political and budgetary pressures. . . . we will apply to the development of our resources the same scientific talents and energies which we have applied to the development of our defenses. . . ."

*John F. Kennedy, Sept. 22, 1960*



## OUR COVER

HALF DOME, winter, Yosemite Valley, photo by Ansel Adams from *This is the American Earth* courtesy of the Sierra Club (see page 41).

The AMERICAN GEOLOGICAL INSTITUTE is a non-profit professional service organization established and managed by the scientific societies in the fields of geology and geophysics in cooperation with the National Academy of Sciences-National Research Council. It is the instrument of the profession serving and advancing the welfare of the geoscientist in matters relating to education, professional responsibilities and government relations. It is an active member of the Scientific Manpower Commission. It also functions in the stimulation of public education and awareness of the earth sciences, through career literature, the scouting program and other channels of communication.

GEOTIMES is the news magazine of the geological sciences. It reports on current events in the earth sciences, public education and public relations efforts throughout the profession, as well as appropriate legislative and governmental issues. It announces scholarships, fellowships, publications and new developments. It provides a forum for discussion of timely professional problems, and affords a common bond between the many specialized groups within the earth sciences.

# An Oil Man looks at the U S S R

by NEAL J. SMITH<sup>1</sup>

In August of this year, an industry team selected by the American Petroleum Institute and sponsored by the State Department visited the USSR to study oil refining, production, research, and related phases of the petroleum industry (with the exception of the gas industry which will be the subject of a separate visit by another delegation in the future) in the USSR. Following are the names and affiliations of the ten delegates.

W. W. KEELER, Executive Vice President  
(Chairman of Delegation)  
Phillips Petroleum Company  
Phillips Building  
Bartlesville, Oklahoma

IRA H. CRAM, Senior Vice President  
Continental Oil Company  
30 Rockefeller Plaza  
New York, New York

W. M. ELIAS, Vice President  
Pan American Petroleum Corporation  
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Tulsa 2, Oklahoma

GEORGE S. DUNHAM, Director  
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30 Rockefeller Plaza  
New York, New York

NEAL J. SMITH, Vice President  
Chevron Oil Company  
(Subsidiary of Standard Oil Co.  
of California)  
3919 Essex Lane  
Houston, Texas

NOYES D. SMITH, JR., Vice President  
Shell Development Company  
P. O. Box 481  
Houston 1, Texas

ROBERT EBEL  
Office of Oil and Gas  
Department of the Interior  
Washington 25, D. C.

ALEXANDER GAKNER<sup>2</sup>  
U. S. Bureau of Mines  
Department of the Interior  
Washington 25, D.C.

The services of the two Department of Interior members of the group were invaluable. Messrs. Gakner and Ebel spoke and read Russian fluently, and both had technical backgrounds. Virtually all of the interpreters available to us in the USSR were nontechnical, hence relatively ineffective as go-betweens in discussing equipment or processes, so Ebel and Gakner were worked to the point of hoarseness day after day attempting to make up for this deficiency. Their help was also valuable in the field of social intercourse because the Russian interpreters frequently found the American idiom too much for them. These comments are made because of the unwarranted 'spy' labels and other exaggerated remarks made about these men in the Soviet Union after the delegation had left the USSR.

Except for some initial horsetrading when firming up the itinerary in Moscow and an occasional misunderstanding during our travels relating to modes of travel, our respective capacities for eating and drinking, etc., our contacts in the USSR were friendly and even cordial. We saw what we expected to see—occasionally, a little more. Not all our questions were answered and those that were not were often the important ones (the kinds we here will not answer for a Russian or another competitor). The language barrier

<sup>1</sup> NEAL J. SMITH, a geologist-geophysicist, is a member of AAPG, SEG, AGU and the Seismological Society.

<sup>2</sup> EDITOR'S NOTE: Alexander Gakner is a member of the AGI Translation Committee.





W. W. Keeler (2) head of the American petroleum delegation to the USSR receives in Baku a model derrick from I. M. Musayev (3), Chief Engineer of the Azerbaydzhan Oil Administration (Azneft). Other U. S. delegation members in the picture are Alex Gakner (1), George T. Piercy (4), Noyes D. Smith, Jr. (6), George S. Dunham (7), George F. Getty II (8), Robert Ebel (9), Neal J. Smith (10), W. M. Elias (11), Ira H. Cram 12). Other Russians are D. K. Polyakov (15) Chief of Anglo-American Section, State Scientific-Technical Committee (GNTK) who served as Soviet guide of the delegation, V. Gorbunov (13) interpreter and engineers of the Novo Baku refinery (5, 14, 16).

did not help us, of course. In spite of all this, we came away with a considerable body of fact and useful impression of the Soviet oil industry.

The group covered more than 7,000 miles by plane, train, and boat within the USSR from Leningrad on the north to Ufa on the east and Baku on the south. Facilities visited were:

#### REFINERIES

Ufa ( <i>Ural-Volga region</i> )	280,000 B/D
Novobakinskiy ( <i>Baku</i> )	60,000 B/D
Syzran ( <i>Down Volga from Kuibyshev</i> )	140,000 B/D
Novo-Kuibyshev ( <i>Ural-Volga region</i> )	300,000 B/D

#### OIL FIELDS

Tuymaza-Octyabrsk ( <i>Ural-Volga region</i> )	247,000 B/D
Karadag ( <i>Baku region—gas distillate</i> )	20,000 B/D
Artyom ( <i>Baku region offshore</i> )	25,000 B/D
Zhirnovsk ( <i>North of Stalingrad</i> )	35,000 B/D

#### INSTITUTES, COMMITTEES, COUNCILS

State Scientific and Technical Committee	Moscow
Institute Giproneftezavod ( <i>Refinery design</i> )	Moscow
All Union Scientific and Research Institute ( <i>Oil development</i> )	Moscow
Scientific Research Institute	Ufa
Gosplan	Moscow
Regional Economic Council	Stalingrad
Sojuznefteexport	Moscow

A resume of the technical findings in their broader aspects may be of interest.



The U. S. delegation discusses the administration of the Octyobrysk oil field with Russians. Left to right: Gorbunov (Russian interpreter) Ira Cram, Neal Smith (bending over table), Alex Gakner (standing), W. W. Keeler (back to camera), George Piercy (white shirt), George Getty II, and Robert Ebel. Photo by Tass.



Portable seismic equipment in the Permanent Exhibition of Science and Industry, Moscow. Photo by Neal J. Smith.



Gate in the wall of the old city at Baku. Photo by Neal J. Smith.



## EXPLORATION

We saw no exploration in progress, either geological or geophysical. It appeared from our discussions, however, that the Soviets have large numbers of geological and geophysical parties in the field; and from the general appearance of the equipment seen here and there, it is probable that they do good work. In exploring the particular areas visited however, it would appear that the Soviets do not rely on geophysics to the same extent that we do. This is reasonable because in these areas and, in fact, in much of the USSR the Soviets find themselves in a relatively early stage of the exploration cycle—that is, they are still working with large simple features, many of which are shallow and some of which are mappable by surface geology.

We had been puzzled by the success ratios published by the Soviets ranging from five successful exploratory wells to one failure for the union as a whole to 8 to 1 in some basins. The over-all U. S. average is one success for ten failures although we do considerably better than this for tests drilled on the basis of geology and geophysics. We learned that the explanation of this was that whereas in this country we classify as an exploratory success only the discovery well, the Soviets add to that a series of followup tests aimed at outlining the producing area in its entirety. The majority of these will be producers. The Soviets intimated that they might change this to a system more comparable to ours now that those in power had become a little more understanding about the element of chance in the oil business.

## PRODUCTION

Obviously, our visits to a few producing fields and our discussions with the few groups of engineers and geologists are not sufficient framework for making a complete analysis of the Soviet's present and future producing capacity. The fields we saw and discussed account for about one-tenth of the current production. We were able to note, however, that they were producing their fields in a manner that, while different from ours, seemed well tailored to their needs. Their equipment was adequate and sometimes excellent and their personnel both numerous and capable. Further, it was quite apparent that the USSR is in an early stage of its oil discovery cycle (perhaps equivalent to the United States thirty years ago when we too were still finding and developing large, simple

structures). Considering these factors, together with the numerous sedimentary basins in the USSR and the fact that their production goals for the current seven-year plan were exceeded in 1959 and will likely be again for 1960, there seems to be no reason to suppose the Soviets will not achieve their 1965 goal of 4,750,000 to 4,800,000 barrels. This is more than three times the USSR output in 1955 and will be more than two-thirds of the current annual production in the United States. A comparable expansion in natural gas may also be expected.

In our discussions within the delegation, there was frequently a temptation to use some of the defects which we had observed and some of the differences in the way in which the Soviets operate to make the above conclusions appear less certain. For instance, in the oil fields we observed considerable waste in materials in the way of standing derricks, extra crown blocks and traveling blocks, surplus flow lines, etc. By our standards, their water flooding techniques are not wholly effective. They operate with a large excess of technical and nontechnical personnel and appear to pay small attention to safety practices. With respect to this last, for instance, we saw no hard hats or hard-toed shoes in the field and little evidence of fire control. On one occasion we saw a man on a derrick floor add the tail of his jacket to the tool joint as it was made up. He got it back, however, without difficulty when the driller noticed his problem. The trouble with these criticisms is that they merely suggest that the Soviets could do even better in the way of producing if they were to sharpen up a little. In general, we found it took considerable care to determine the real worth of some of our criticisms. For instance, around semi-permanent or permanent installations the Soviets found it almost impossible to make the steps on stairs or ladders come out even. Their floors were rough and full of projections; jagged pieces of metal might be left protruding near a walkway. When we brought such things to the attention of our host, they remarked that in the first place, their accident records were as good as or better than ours, and, in the second place, they felt the question of real importance was the condition of their pumps, motors, compressors, etc.—the things the walkways and stairs led to. And we had to admit that their equipment was well tended and operating smoothly. As to an uneven or absent step, that was the worker's business—he should notice these things.

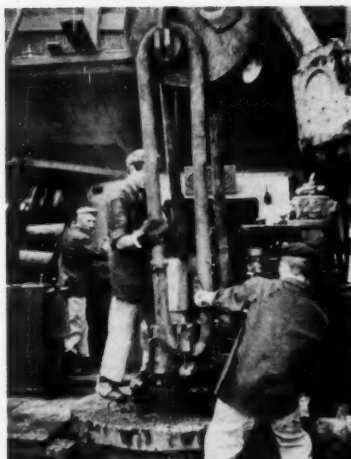
## REFINING

Refineries visited account for one-fourth or one-fifth of USSR capacity. An obvious difference between the USSR and the USA is the product goal. The USSR aims for kerosenes and diesel fuels—the USA for gasolines. The Soviets appear to be turning out the kinds and amounts of the products they desire and seem headed for greater efficiency. When we pointed out some defects in product quality they indicated that they met specifications handed down to them.

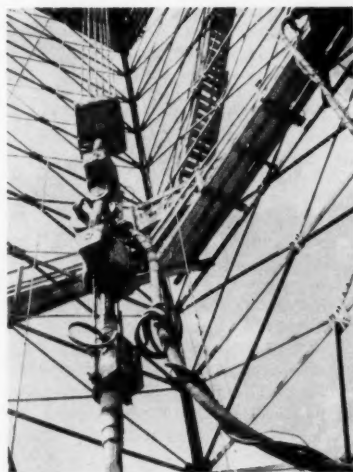
As points of interest it was noted that the Soviets—

- build whole towns to accompany their refineries, including schools and hospitals. This poses a problem in trying to equate refinery construction and operation costs since it is difficult to break out the figures for the municipal construction and maintenance;
- average about forty percent women in the labor force. Women do clerical work, hard hand labor, construction work, and are employed in both technical and administrative capacities;
- use at least fifty percent more people on the job than we would;
- are not strong on safety—that is, as in the case of production, we found many rough floors; uneven stairs; low hung piping; thin, loose steel mats for walkways; concrete walkways with projecting reinforcement bars, etc.;
- separate their units widely, thus using extra quantities of pipe, increasing personnel needed and making automation more expensive;
- tend to let equipment run down;
- spare no effort to increase the skills and education of employees through recognition of achievement, bonus for output, night school, paid educational leave, etc. Conversely, the worker who does not respond, whose attitude is poor, who does not seem willing to improve himself according to his ability is held up to scorn, exhorted by his co-workers (who may lose their bonus or other recognition if his attitude persists); if he does not conform, he will be subject to a "social trial"—a semi-formal nonlegal institution encouraged by the authorities for bringing individuals into line. Note that these things relate to both or either work performance and attitude.
- use small, standard units. Pipe stills run about 30,000 barrels per day, thermofor catalytic crackers about 10,000 barrels

(Continued on page 38)



Rig floor of electro-drill at New Karadag gas-distillate field South of Baku on the shores of the Caspian Sea. Note loose jackets and the lack of hard hats and safety shoes. Observe automatic breakout tongs in background. Photo by Noyes Smith.



An up-the-derrick shot of the electro-drill at New Karadag shows the cabling and slip ring arrangement for carrying 1650 volts down the hole to the drill. Photo by Noyes Smith.

# Ocean-Wide Surveys

by RICHARD C. VETTER<sup>1</sup>

During the last year or two the general public and the scientific community have become aware of the need for more oceanographic research for scientific, economic, and military reasons. At least part of this interest can be associated with the activities of the National Academy of Sciences' Committee on Oceanography and to their twelve chapter report "Oceanography 1960-1970."

When the first chapter (summarizing the general conclusions and recommendations of the Committee) was published in February of 1959, the general reaction was much wider than had been expected by Committee members. Subsequent chapters of the report have dealt with basic oceanographic research, resources of the ocean, defense applications of oceanographic research, artificial radioactivity in the marine environment, new oceanographic research ships, engineering needs and new oceanographic devices, education and manpower requirements, international cooperation, and a general survey of the status of the marine sciences in the United States in 1958. The most recent chapter and possibly that of greatest interest to readers of *GeoTimes* is Chapter 9, "Ocean-Wide Surveys."<sup>2</sup>

The Ocean-Wide Surveys chapter was prepared by a special panel of the Committee on Oceanography organized to study the objectives and general requirements of an ocean-wide survey program. Dr. Harry Hess of Princeton University is chairman of the Committee's Ocean-Wide Surveys Panel. Other panel members are Dr. Maurice Ewing (*Lamont Geological Observatory*), Columbus Iselin (*Woods Hole Oceanographic Institution*), Roger Revelle (*Scripps Institution of Oceanography*) and Gordon Riley (*Bingham Oceanographic Laboratory*). Advisers to the panel are Robert Fisher and John Knauss (*Scripps Institution of Oceanography*), Bruce Heezen (*Lamont Geological Observatory*), and Allyn Vine (*Woods Hole Oceanographic Institution*). Many other individuals contributed to the preparation of the report; particularly Fritz Koczy (*University of Miami*) and Dixy Lee Ray (*University of Washington*).

The unifying concept of the entire Committee on Oceanography report has been that of applying all of the scientific disciplines in concert to the general problem of observing, measuring, and under-

standing the oceans. Although it has become somewhat trite to quote the percentage of the earth's surface covered by sea water, the general popularity of this expression testifies to the need which we land animals have for reminding ourselves that most of the world is covered by the oceans. While most of man's scientific activities are of necessity conducted on land, many of the facts of nature cannot be known or understood without observing the ocean and the world above and beneath it.

## JOINT EFFORTS NEEDED

In reviewing the need for and the capabilities of accomplishing an ocean-wide survey, the Committee states that: "Both for scientific reasons . . . and for the economic and defense needs of society, maps of the world oceans must be made." The Committee observes that "no one country has sufficient resources, ships, or manpower to do the entire task within a reasonable time but several countries working together could complete a useful survey within the next decade or so. Investigations of the synoptic conditions in the upper water layers require many observations in a short time and can be accomplished only by joint effort of oceanographers in different countries. Surveys of the ocean floor and the seasonal and average physical, chemical and biological conditions in the water can be accomplished by the cooperative efforts

<sup>1</sup> RICHARD C. VETTER is secretary of the Committee on Oceanography, National Academy of Sciences—National Research Council.

<sup>2</sup> In press. A limited number of copies of the Committee report have been published and are available through the Printing and Publishing Office of the National Academy of Sciences. Inquiries and requests should be addressed directly to that office.

of a number of nations, ships and scientific and engineering disciplines."

The report emphasizes the need for international cooperation and visualizes a general program of systematic observation encompassing bottom morphology, ocean sediments, geomagnetism, heat flow, gravity, seismic and crustal studies, biological productivity, composition and distribution of plankton and the larger forms of marine life, and distribution of water properties such as temperature, salinity, density and sound velocity.

The report visualizes the United States' share of an ocean-wide ocean-deep survey program as roughly proportional to our share of support of the United Nations, that is about 30 per cent.

#### COORDINATED SCIENTIFIC FACTS SOUGHT

The report outlines the general, physical and chemical features of the ocean environment which should be observed; fundamental data which is required in order to establish the general characteristics of the ocean: its salinity, heat content, surface circulation, deep currents, distribution of life in the sea, etc. In addition, a second part of the survey is designed to measure the seasonal variations between summer and winter of the top 1,200 meters. A third part of the physical and chemical program would stress jointly organized efforts by many ships in observing a large area of the oceans synoptically.

A biological survey program is also detailed in the report. A program of collection of plankton and zooplankton, measurement productivity measurements, etc., is stressed.

By far the largest share of the total program is set aside in the report to a general survey of bathymetric, gravimetric and magnetic features of the deep sea floor. *GeoTimes* readers are undoubtedly interested in the proposal that an ocean-wide bathymetric survey be made along lines spaced 15 kilometers apart. Geological information would be obtained at stations spaced approximately every 60,000 square kilometers. The Committee believes that the most efficient method of surveying the ocean would use one group of ships that remain continuously underway and maintain highly accurate navigational positions while other ships would stop and take samples at specific station locations. Underway ships would take continuous soundings, measurements of the magnetic field, and gravity fields. Sub-bottom echoes from small explosions should be recorded. Anchored buoys, aircraft, and other devices would also be used in the survey program.

#### GEOLOGY-GEOPHYSICS PROGRAM

The geological observation program carried out by "station" ships would involve standard geological observations including a piston core, a gravity core, bottom photographs, a grab sample, and a temperature probe. By combining instruments, such as a piston-gravity corer and camera, and using high speed winches, the whole operation should take no more than 8 hours. In good weather an auxiliary boat can be used to drop explosives for a short refraction seismic station of 20-40 km."

The committee report estimates that the bathymetric survey portion of the program to be conducted by underway ships would require approximately 200 ship years for completion. The U. S. share of this program would be about 60 ship years, easily attainable over a 10-year interval with present and projected available ships.

The geophysical observations (made by the same ships as would be making station observations of biological, physical, and chemical properties) would require about 8 additional ship years.

The report continues: "While it is contemplated that by 1970 there may be 11 new ships available for survey work, a plan to cover the next two or three years is required. For these initial surveys emphasis is placed on bathymetry, physical oceanography and geophysical work. . . .

"The area to be chosen for the first detailed closely spaced ocean-wide survey grid should be one which has not been previously surveyed, where major scientific problems can be solved, and good navigational control is available. At present Loran C and SOFAR position control is available for the North Atlantic. Since data are particularly sparse in the Southern half of the North Atlantic and good navigational control is available, it seems that this is an ideal area in which to begin the surveys on a closely-spaced grid.

#### MID-ATLANTIC RIDGE

"Any profile of topography, magnetic or gravity anomalies across the Atlantic, Indian or South Pacific oceans is dominated by the Mid-oceanic ridge system. A detailed survey of a portion of this 75,000 km. long feature will undoubtedly reveal patterns of world-wide significance; patterns which should be of great value in interpreting the widely-spaced grid surveys of the South Pacific."

"The survey lines should extend completely across the ocean from between 30°

(Continued on page 36)

Dooley and others report

# DENVER GSA MEETING

a huge success

An account by  
Daniel S. Turner,  
Publicity Chairman



The striking beauties of the Blummengarten-Girlen Ballet posed as they came off stage after a rockette-type precision dance routine in the Pick and Hammer.



Several of the dainty, young lovelies of the Blummengarten-Girlen Ballet relax off-stage.

The 73rd annual convention of the Geological Society of America and all affiliated societies climaxed their meetings at the Denver Hilton Hotel, between October 31 and November 2 with the hilarious Pick and Hammer show presented on Tuesday evening at the Civic Auditorium. A "sell out" crowd rolled in the aisles with laughter at the "Blummengarten-girlen ballet" line of hairy and brawny legs and Mr. Ross M. Dooley: a bone fido member of the Society of Vertebrate Paleontologists (A white English Bull Dog). Subtle satire and sweeping slices on everything from the convention program to the Penrose Bequest and the A.A.P.G. kept the crowd in uproarious laughter between and during the musical numbers of "The Hand-Picked and Hammering Chorus," of about seventy polished singers, and the music of "Al Maraschino and his 15 Manhattans" in the orchestra pit. Several of the original choral numbers will go down in the records and on tape as contributions to the great music of the geological profession. Complete record disks of the show can be purchased through Mr. Robert E. Davis, U.S.G.S., Denver Federal Center, Denver, Colorado at prices determined by total demand and volume.

Registration and technical sessions broke all records for attendance. Slightly over 2500 delegates and a large number of their ladies signed in for the sessions, field trips and excursions. All field trips (see *October GeoTimes*, page 16) were scheduled to capacity and were favored by the beautiful Indian summer weather of the Rockies. Statistical columns show that this year's total attendance of 2500 exceeded the previous record at Pittsburgh by 300 persons. Technical sessions listed 480 papers in nine sessions, compared with 320 talks in six sessions at the previously record-breaking



**Hollis D. Hedberg**, retiring GSA President, delivers his Presidential Address "The Stratigraphic Panorama."

## PICTURE HIGHLIGHTS OF THE DENVER MEETING

Pittsburgh meetings. Among the registrants were listed fifteen representatives from foreign countries including Australia, Argentina, Burma, Canada, Chile, Egypt, England, Holland, Iceland, India, Jamaica, Mexico, New Zealand, South Africa and Yugoslavia.

A majority of the delegates, it seems, attended the annual smoker where about 2000 men and their wives enjoyed the convivial atmosphere of the Grand Ballroom of the Hilton between 9 p.m. and midnight, consuming 22 barrels of beer, 800 bottles of soft drinks and 60 pounds of pretzels and potato chips with a tasty cheese dip.

Not all of the convention was devoted to hilarity, however, as could be clearly discerned from a review of the program and the tight schedule of papers and business meetings packed into three very full days and nights. The reader is referred to the official program of the convention for a summary of the medal awards and business sessions and to the photographs of the highlights of the more serious aspects of the convention which appear on following pages in this issue of *GeoTIMES*.



**Walter L. Bucher** (right) accepts the coveted Penrose Medal from President Hedberg.



**Konrad B. Krauskopf**, recipient of the Arthur L. Day Medal, is studying in Europe. The award was accepted on his behalf by Charles F. Park, Jr. (left) from President Hedberg.



**Edwin D. McKee** (right), General Chairman of the Denver Meeting, chats with GSA President Hollis Hedberg.

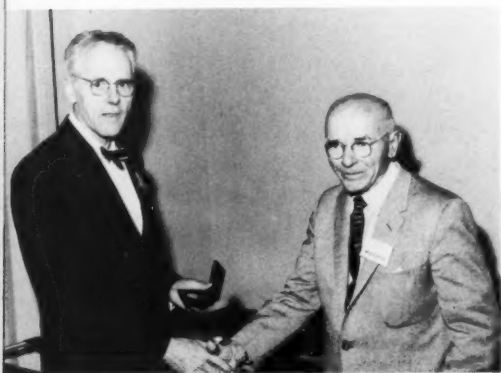




**A. C. Trowbridge** (left) accepts the Neil Miner Award from Robert Shrock, past-president of the National Association of Geology Teachers. The award is made each year to an outstanding teacher of geology.



**Carey Cronsis** President of the National Association of Geology Teachers presents his Presidential Address before the Society.



**Tom F. W. Barth** (left) of Oslo, Norway receives the Roebling Medal of the Mineralogical Society of America from MSA's President Joseph Murdoch. Dr. Barth is the retiring president of the Geochemical Society.

## MORE PHOTOS FROM DENVER



**Kenneth E. Caster**, President of the Paleontological Society delivers his address "Enigmatic Paleontology" before the Society.



**Donald L. Graf** (left) is the recipient of the Mineralogical Society of America Award presented by President Murdoch.





**Walter Wenzel** (left) representing the Boy Scouts of America makes the presentation of plaques to GSA and AGI in recognition of services to scouting. Accepting for the GSA from Mr. Wenzel is **Thomas B. Nolan**, the society's new president. **AGI President Moore** and **Chalmer L. Cooper**, Chairman of the AGI Boy Scout Committee (extreme right), hold the plaque presented to the Institute.



**AGI President Raymond C. Moore** (right) was host to Past Presidents of the American Geological Institute at breakfast. From left to right: **Joseph L. Gillson**, **J. V. Howell**, **Chester R. Longwell**, **William B. Heroy**, and **President Moore**. Present at the meeting, but not in the photograph were past presidents **Carey Croneis**, **Morris M. Leighton** and **Paul L. Lyons**.



**Duncan R. Derry** President of the Society of Economic Geologists delivers his address before the Society while a fellow-Canadian, **J. M. Harrison** (left) looks on.

## John T. Lonsdale Dies

Dr. John T. Lonsdale, head of the Bureau of Economic Geology of the University of Texas died in Austin, Texas on October 5, 1960 at the age of 65. He had broad background in academic and state survey work and had served as State Geologist in Texas for 15 years.

Dr. Lonsdale held membership in 9 AGI Member Societies—GSA, MSA, GS, AAPG, AIME, AGU, SEG, SEPM, and AASG.

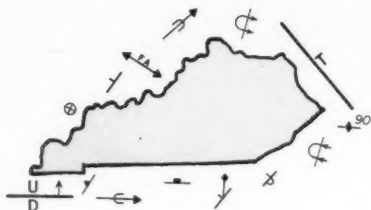
## Geologic Map of United States Reprinted

The United States Geological Survey recently announced a new printing of the **GEOLOGIC MAP OF THE UNITED STATES** compiled by **George W. Stose**, assisted by **O. A. Ljungstedt**, and first published in 1933.

The scale of the map is 1:2,500,000 (1 inch equals about 40 miles) and the map consists of four sheets (NE, SE, SW and NW) each measuring 27 by 47 inches. The 1960 reprinting of the map features important color changes for greater readability. Alaska and Hawaii are not included.

To illustrate advancement in map reproduction facilities over the years, the new printing was done on high speed lithographic 2-color presses employing lightweight aluminum plates whereas the original edition was printed on old-style flat-bed presses using lithographic stones. Ninety two lithographic stones, quarried in Germany and each weighing 400 to 500 pounds, were required for the original U.S. map and the printing operation took about ten times as long as for the 1960 printing.

The new 1960 maps are available at \$1.50 per quarter or \$6.00 per set of 4 from the U. S. Geological Survey. Orders may be addressed to the U.S.G.S., Washington 25, D. C., or Federal Center, Denver, Colorado. They may also be obtained in over-the-counter sales at U.S.G.S. offices in Los Angeles, San Francisco, Denver, Dallas, Salt Lake City and Spokane.



## KENTUCKY GEOLOGIC MAP UNDERWAY

As announced briefly in the July-August issue of *GeoTimes* (p. 28), the Kentucky Geological Survey and the U. S. Geological Survey have begun a most notable and ambitious cooperative program of geologic mapping in the State, designed to provide complete geologic map coverage of Kentucky in the next ten years. This new program is being carried on in conjunction with three important continuing cooperative programs supported by these two agencies, including programs for topographic mapping, water resource studies, and coal and clay investigations.

More than 750 geologic maps, each covering about 59 square miles of Kentucky's 40,395 square mile area, are planned in the new cooperative program. The success of this program is dependent, of course, upon the availability of appropriations to both agencies to carry on the work at a level necessary to attain the goal. It is estimated that the program will cost about 12 million dollars—a cost that will be shared equally by the State and Federal Surveys. The U. S. Geological Survey will be responsible for all of the field and office work pertaining to the program, although specific plans for the investigation will be determined by mutual agreement between the two agencies.

The program was started a few months ago by experienced geologists of the Federal Survey who established temporary project offices in Ashland, Corbin, Princeton, Bowling Green, Columbia, Paducah, Elizabethtown, and Pikeville, to begin field mapping. The program is under the direction of Alfred D. Zapp, Chief of the Central Branch of Regional Geology of the U. S. Geological Survey, who is located in Lexington. He will work closely with Wallace W. Hagan, Kentucky State Geologist, and E. R. Branson of the State Geological Survey. It is anticipated that as many as 70 geologists will be assigned to the geologic mapping during the peak years of activity. Thus, the program as planned is much larger in scope than any comparable cooperative geologic mapping program undertaken to date by the Federal Survey.

The cooperative agreement was entered into on September 2, 1960, by the Kentucky Geological Survey and the U. S. Geological Survey, with each agency committing funds for this program in the amount of \$300,000 to be expended by June 30, 1961, or a total of \$600,000 for the first year. It is planned to double these amounts in the succeeding year, with each agency appropriating \$600,000 for the work. The Kentucky State Legislature, through its biennial appropriation, has already approved funds in this amount to support the State share of the program from July 1, 1961, through June 30, 1962.

Of the 120 counties in Kentucky, about one-third have not been mapped geologically. Most of these are in eastern and south-central Kentucky where intensive exploration for oil has created an urgent need for geologic and mineral information. Less than half of the geologic maps of the remainder of the counties are still in print, and most of these are printed on old bases without topography. They are all badly out of date; some were printed as early as 1894.

The multicolor geologic maps that result from the new cooperative program will be overprinted on modern topographic bases, at the scale of 1:24,000. The maps will be single sheets, each complete with a geologic explanation and a columnar section giving descriptions of the major rock units present in the area covered by the map. In addition, the maps will show the location of mines, quarries and gravel pits. A brief paragraph summarizing the economic geology of the area will be included, as will a diagram depicting the geologic structure of the rock layers interpreted along a line of cross section through a representative part of the area.

The maps will provide information essential to orderly, economical, and skillful planning in a great many fields, as, for example, urban and industrial construction, water resources development, mineral exploration, and in countless other programs for land utilization. Most certainly, the cooperative state-wide geologic mapping program in Kentucky will aid immeasur-

ably the industrial and economic development throughout the State.

Cooperative programs between the State of Kentucky and the U. S. Geological Survey are not new. They have been carried on intermittently since 1903. As noted above, three such cooperative programs, exclusive of the new state-wide geologic mapping program, are now in progress.

A most successful cooperative topographic mapping program between the State and the Federal Geological Survey was begun in 1949. During the ensuing seven years the U. S. Geological Survey mapped the topography of the entire State at a total cost of about 7 million dollars, shared equally by the State and Federal Governments. A total of 763 topographic maps resulted from this work, each representing a separate 7½-minute quadrangle. Since 1956, the cooperative topographic mapping program has consisted of up-dating and revising the topography and culture where there has been appreciable recent development. Considerable support for the topographic mapping program was and is being provided by the Kentucky Department of Highways.

To date, Kentucky is the only state of comparable size to have complete and modern large-scale topographic map coverage. Indeed, this coverage has been a major factor in making possible a geologic mapping program of the scope planned.

A second active and important cooperative program involves water resource studies, both surface and subsurface, in several areas in the State. The results of these studies have been extremely useful to those concerned with Kentucky's water development and resource problems. The results can be applied also to other fields, such as highway planning. Approximately one-third of the State's share of \$167,000 in the cooperative program for water studies during the current fiscal year is being provided by the Kentucky Department of Highways.

The third cooperative program, which has been active since 1957, concerns geologic studies being carried on in the coal- and clay-bearing regions of eastern Kentucky. Although the number of dollars being spent on this work is not large (the Kentucky Geological Survey and the U. S. Geological Survey each providing \$16,000 during the current fiscal year), the results are making reliable estimates possible of reserves of these valuable commodities in the areas studied, as well as materially aiding the search for new deposits.

## GSA Southeastern Section

Knoxville, Tenn.  
April 13-15

The Southeastern Section of The Geological Society of America, sponsored by the Department of Geology and Geography, University of Tennessee and the Tennessee Division of Geology, will meet in Knoxville, Tennessee, Thursday, Friday and Saturday, April 13, 14, and 15, 1961. This marks the first meeting of southeastern geologists in Knoxville since 1949, when the University of Tennessee sponsored the Symposium on Mineral Resources of the Southeastern United States. A symposium volume of contributed papers under the editorship of F. G. Snyder was published by the University of Tennessee Press in 1950. Interest generated by the initial symposium led to continued sponsorship by other southeastern universities over the next few years. In 1952 and 1953 the Symposium and the Southeastern Section of the Geological Society of America convened jointly. By 1954 the Symposium was absorbed completely into an established annual meeting of the Southeastern Section, the Knoxville meeting marking the eighth in succession.

The 1961 meetings will include a program of technical papers and discussions presented in sessions held in the Andrew Johnson Hotel on April 13 and 14. The program will primarily emphasize research by southeastern geologists, but papers by non-southeastern geologists on southeastern geology are also invited. Abstracts of papers to be presented must be submitted to Harry J. Klepser, Program Chairman, Department of Geology-Geography, University of Tennessee, Knoxville no later than February 1, 1961. On Saturday, April 15, one field trip is planned to the Mascot-Jefferson City zinc district and a second will consist of a stratigraphic-structural study of the Valley and Ridge Province in Tennessee.

A Smoker will be held on Thursday night, April 13, and the Annual Banquet on Friday night, April 14. A special program for ladies is being planned.

Reservations for housing can be made by writing directly to the Andrew Johnson Hotel. Information regarding additional housing can be obtained from R. E. McLaughlin, Department of Geology and Geography, University of Tennessee, Knoxville.

Officers of the Southeastern Section are: Thomas L. Kesler, Chairman; Harry J. Klepser, Vice-Chairman and Romeo Martin, Secretary.



## FIELD GEOLOGY INSTITUTE

**Sponsored by  
Indiana U.**

Thirty participants received concentrated training in Rocky Mountain geology during Indiana University's Summer Institute in Field Geology for College Teachers, sponsored by the National Science Foundation. The Institute extended from June 16 to July 29, 1960, and was held at the Indiana University Geologic Field Station in the Tobacco Root Mountains of southwest Montana.

Emphasis was given to the geologic history of the Northern Rocky Mountains from field observation in the Field Station region and trips to Yellowstone National Park, Beartooth Mountains, Teton Mountains-Jackson Hole, Gros Ventre and Hebgen Lake slides, Big and Little Belt Mountains, Sun River Canyon, Glacier National Park, Flathead Lake-Polson region, Missoula, Butte, Helena-Marysville region, and the Dillon-Bannack region.

Study centered on the stratigraphic key dealing with Archeozoic crystalline rocks, Proterozoic Belt series examined in the classic type areas, unconformable relations of Cambrian to Precambrian, Cambrian sequence, Cambro-Devonian unconformity, Devonian to Permian including regional unconformities, Jurassic and Cretaceous relationships, and Tertiary to recent basin sedimentation. With this background the group concentrated on pre-Laramide intrusives and extrusives—sills and dikes, thick widespread Elkhorn Mountains volcanic sequence, Laramide history including the

Group photo taken at the Institute of field geology (left to right) sitting: C. Vitaliano, J. Lowry, K. Nelson, J. Baldwin, M. Austin, E. McKee; kneeling: H. Kane, D. Hawley, W. Ryan; standing: J. Mead, J. Patton, F. Honkala, G. Burchfield, G. Stewart, J. Dobell, J. Schroyer, D. Harris, H. Palmer, P. Myers, E. Harris, L. Goldthwait, W. Lowry, A. Bates, J. Harding, D. Wills, R. Clem, S. Skapinsky, C. Balk, J. Allen, C. Kierstead, C. Rich, R. Hagni, D. Carr, D. Rahm, G. Thompson, H. Smedes, M. Klepper, B. McKee, W. Lowell, R. Gutschick.

Boulder Batholith, Butte structure and mineralization, Tertiary basin development, geomorphic history and Pleistocene glaciation. The participants were also introduced to the application of geophysics—seismic, gravity and paleomagnetic studies—to the solution of basic problems of the region.

A number of noted geologists served as visiting lecturers and field leaders during the Institute and members of the regular Field Station staff were called upon from time to time to instruct in their specialties.

The staff of the Institute included Raymond C. Gutschick of Notre Dame University, Fred S. Honkala and Robert M. Weidman of Montana State University in addition to John B. Droste, Thomas E. Hendrix, Judson Mead, John B. Patton, Charles J. Vitaliano and Wayne R. Lowell of the University of Indiana. Lowell served as Director.

Douglas S. Coombs of the University of Otago visited the Institute under auspices of the AGI Visiting International Scientist Program. Other visiting lectures and field leaders who visited the institute included



View of the lower campus, Indiana University Geologic Field Station in the Tobacco Root Mountains of southwest Montana.



G. D. Robinson (kneeling), a visiting field leader from the U.S.G.S., discusses the tertiary of Toston Basin.



The Institute group collects angite crystals from the Elkhorn Mountain Volcanic Series in the North Boulder Valley.



M. Mudge of the U.S.G.S., Denver, is leading a discussion of the structure in Hannan Gulch of Sun River Canyon, Sawtooth Mountains.



I. Witkind of the U.S.G.S. served as group leader at Earthquake Lake caused by the Hebgen Lake Slide (GeoTimes, October 1959).

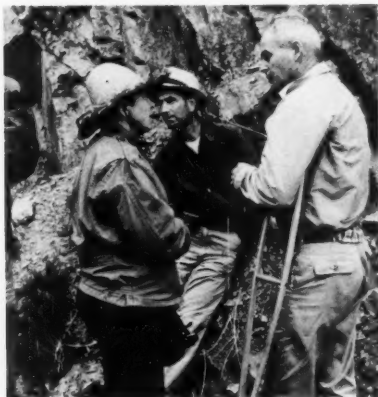


Clyde P. Ross pictured at Logan Pass in Glacier National Park served as a visiting field leader in that area.





Adolph and Eleanor Knopf, visiting field leaders, were photographed on the Boulder Batholith trip near Helena, Montana.



Christina Lochman Balk (left) discusses the geology of the type section of the La Hood Formation with Edwin D. McKee as Wallace D. Lowry leans against the outcrop in the background.

Christina Lochman Balk, Robert Ingersoll, Montis R. Klepper, Adolph Knopf, Eleanor B. Knopf, Edwin D. McKee, William J. McMannis, Melville R. Mudge, G. D. Robinson, Clyde P. Ross, William D. Thornbury, Harry E. Wheeler and Irving J. Witkind.

The teacher participants were Joseph T. Allen, Jr., Muriel B. Austin, Joan Baldwin, Allen N. Bates, Gail R. Burchfield, Donald D. Carr, Richard H. Clem, Joseph P. Dobell, Lawrence Goldthwait, Richard D. Hagni, James L. Harding, Clyde E. Harris, Jr., David V. Harris, David Hawley, Henry E. Kane, Caroline H. Kierstead, Jean Lowry, Wallace D. Lowry, Paul B. Myers, Jr., Katherine G. Nelson, Harris A. Palmer, David A. Rahm, Charles C. Rich, William A. Ryan, Jr., James B. Schroyer, Stanley A. Skapinsky, Glenn W. Stewart, Gerald L. Thompson and Donald L. Wills.

## University of Miami Oceanographic Cruise Concentrates on Geology

Dr. Gene A. Rusnak, Research Assistant Professor of Marine Geology of the University of Miami (Fla.) has been the scientific leader of a Caribbean Sea Expedition, CARIB, conducted during the months of October-December jointly by the Marine Laboratory, University of Miami and the Scripps Institution of Oceanography, University of California. A Scripps research vessel, the *Spencer F. Baird*, has carried the expedition.

The program will be primarily a geological investigation, designed specifically for collecting long piston cores from areas that may provide a fairly complete stratigraphic record of the Pleistocene. A second, important phase of this program is the completion of a hydrographic cross-section of the eastern Caribbean. These studies form a portion of the more extensive program instituted by The Marine Laboratory for studying tropical oceanographic phenomena and the changes that might have occurred with varied climatic events in the past.

The proposed program includes piston- and gravity-coring with precise bathymetric control, hydrographic studies by water sampling and bathythermographic measurements, plankton-distribution studies in the upper 200 meters, studies of the chemical properties of the water, and measurements of the vertical distribution of radium near the sea floor.

## Wisconsin Fellowships

The University of Wisconsin Alumni Research Foundation announces its Fellowship Program directed toward support of graduate study.

The awards carry a stipend of \$2,200 plus fees and tuition for a twelve-month period, beginning July 1 or September 1, 1961, with one month vacation. Application may be made for renewal of a fellowship for additional years if the work of the first year is satisfactory.

Closing date for the 1961-62 program is February 15, 1961. Additional information about the program and application forms may be obtained by writing J. E. Willard, Dean, Graduate School, University of Wisconsin, Madison 6, Wisconsin.

# GEOTIMES INDEX

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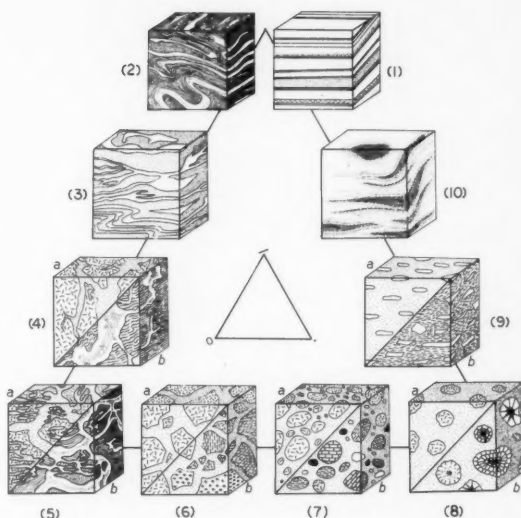
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Pattern 7, 8, and 9 = ophthalmitic or disseminated fabrics

Pattern 11 = massive or homogeneous fabric (to be placed at the fourth corner of a tetrahedron of which this drawing shows one face only).

(This purely geometric classification and nomenclature of rock fabrics is a systematic modification of patterns pictured by PAUL NIGLI in "Rocks and Mineral Deposits," Basel 1948; San Francisco 1954, for chormatic, polyschematic rocks and mineral deposits. Additional adjectives may be used in order to designate transitional patterns: pattern 3 may be called phlebitic stromatite, pattern 4a phlebitic merismite, pattern 8b microlithic ophthalmite, and pattern 10 nebulitic stromatite.)

G. C. Amstutz, 1959,  
(Proc. Geol. Assoc. Canada 11, p. 104)

## AGI Data Sheet 21

AGI Data Sheet 21, *Geometric Classification of Rocks and Mineral Deposits*, has been prepared by G. C. Amstutz, Missouri School of Mines, Rolla, Mo., for the AGI Data Sheet Committee.

This data sheet presents an objective approach to the difficult problem of de-

scribing and classifying basic features of rocks and minerals. Its publication does not imply AGI endorsement of all terms or descriptions employed.

Persons with suggestions for additional data sheets are requested to contact Dr. Richard M. Foose, Chairman, Earth Science Division, Stanford Research Institute, Menlo Park, California.



## A GEOMETRIC CLASSIFICATION OF BASIC INTERGROWTH PATTERNS OF MINERALS

A connotation-free set of purely descriptive patterns, 1) for studies of rocks and mineral deposits, particularly for the present revision of genetic theories, 2) for ore dressing microscopy, metallography, and other fields of applied petrology, mineralogy, and metallurgy.

Between most of these nine common locking types there are naturally gradational transitions with regard to both pattern and size. Particle or grain size data are a pre-requisite of any accurate study of rocks and mineral deposits and enhance the value of this chart.



Type 1a Simple intergrowth or locking type; rectilinear or gently curved boundaries. Most common type, many examples.



Type 1b Mottled, spotty, or amoeba-type locking or intergrowth. Simple, common pattern; many examples.



Type 1c Graphic, myrmekitic, or 'eutectic' type. Common; examples: chalcopyrite and stannite; quartz and feldspars; etc.



Type 1d Disseminated, emulsion-like, drop-like, buckshot or peppered type. Common; examples: chalcopyrite in sphalerite or stannite; sericite, etc. in feldspars; tetrahedrite in galena; etc.



Type 2a Coated, mantled, enveloped, corona-, rim-, ring-, shell-, or atoll-like. Common; examples: chalcocite or covellite around pyrite, sphalerite, galena; etc.; kalyphite rim, and other rims.



Type 2b Concentric-spherulitic, or multiple shell-type. Fairly common; ex.: uranite with galena, chalcopyrite, bornite; cerussite-limonite; Mn- and Fe-oxides; etc.



Type 3a Vein-like, stringer-like, or sandwich-type. Common; ex.: molybdenite-pyrite; silicates; carbonates; phosphates; etc.



Type 3b Lamellae-layered, or polysynthetic type. Less common; examples: pyrrhotite-pentlandite; chlorite-clays; etc.



Type 3c Network, boxwork, or Widmanstatter-type. Less common; ex.: hematite-ilmenite-magnetite; bornite or cubanite in chalcopyrite; millerite-ilmenite; metals; etc.

G. C. Amstutz - 1954, 1960

### MEMBER SOCIETIES

of the

### AMERICAN GEOLOGICAL INSTITUTE

June 1960 Edition

A 16 page booklet which gives data on the organizations, history, purpose, membership requirements, publications, and other pertinent information on the fourteen Member Societies of the American Geological Institute.

Lists present officers of all Societies.

*Free on request from*

**AMERICAN GEOLOGICAL INSTITUTE**

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Washington 25, D. C.

### AGI LIST OF PUBLICATIONS

AGI has recently published a new list of publications, listing the various journals and other publications published by AGI.

*sent free upon request*

*by*

**AMERICAN GEOLOGICAL INSTITUTE**

2101 Constitution Ave., N.W.

Washington 25, D. C.

## Jenkins Named Research Director

George R. Jenkins, associate professor of geology at Lehigh University was recently named the Director of the Lehigh University Institute of Research. Jenkins has served as assistant and associate director of the research institute since 1956. The Institute of Research, founded in 1924, now conducts over a million dollars of research annually.

## Meteorology Curriculum Added at Columbia

A new curriculum leading to the M.A. and Ph.D. degrees in meteorology is being offered at Columbia University for those accepted as graduate students in the Cognate Fields Program by the Department of Geology. The program of graduate training will be coordinated with meteorological research being conducted at the University's Lamont Geological Observatory.



**New Officers of the AGI** were elected by the Board of Directors at the November 3 meeting in Denver. They are (left to right) Donald H. Dow, Secretary-Treasurer; Raymond C. Moore, Past-President; Ian Campbell, President; and Gordon I. Atwater, Vice President.

## The Committee of 1000

### Recent Additions to the Committee of 1000 For AGI 1960\*

Charles W. Allen	Glen M. Ford
Richard Alvord	John C. Haff
John J. Benedetti	Robert B. Hall
J. Robert Berg	Rae L. Harris, Jr.
William A. Bowes	Charles J. Hoke
Robert H. Burton	George Katavolos
D'arcy M. Cashin	Charles H. Maxwell
Georgianna D. Conant	Fred J. Meek
Louis C. Conant	Eugene E. Ruley
K. F. Dallmus	Sigma Gamma Epsilon
James W. Danser	Alpha Rho Chapter, Michigan State Univ.
Orrin N. Dortch	W. W. Simmons
A. F. Dosse	H. W. Thoms
East-Central Section NAGT	Max L. Troyer
Maxim K. Elias	William G. Weist, Jr.
Alfonso M. Escalante	John R. Williams
J. McLaren Forbes	Theodore Woodward
	W. T. Woodward

\* Previous lists published in *GeoTimes*, March, April, May-June, July-August, and September issues.

The Annual Meeting of the Board of Directors of the American Geological Institute was held on November 3 in Denver following the GSA meeting.

The meeting was well-attended by Directors and their alternates representing the AGI Member Societies. Eight presidents of the 13 AGI Member Societies were present on special invitation of President Raymond C. Moore. President T. O. Hall of the Society of Exploration Geophysicists was invited as an observer. Inasmuch as the SExG had formally placed its decision to withdraw from the AGI before the Institute's Board last April, the Society is no longer a Member Society.

The Directors heard reports of the officers and the Executive Committee on the operations of the Institute during the past year, but the main portion of the meeting was given to consideration of the AGI reorganization effort. After a presentation of the Reorganization Committee report by B. Warren Beebe, the Directors and invited guests, acting as a committee of the whole, discussed and voted on fundamental points of the reorganization. Based on these decisions, the final draft of the Constitution and Bylaws will be drafted within the coming weeks and the proposals will be fully publicized among the membership of the Member Societies.

The new officers elected by the Board for 1961 are: Ian Campbell, *President*; Gordon I. Atwater, *Vice President*; Donald H. Dow, *Secretary-Treasurer*; and Raymond C. Moore, *Past President*.

## CALIFORNIA ENGINEERING GEOLOGISTS MEET

a report by  
Ira E. Klein

The Franciscan formation—which has confounded those who have attempted to unravel the geology of California's Coast Ranges since Lawson's time and has bedeviled highway engineers, tunnelers, and dam builders—was given a thorough going over at the symposium session of the 3rd Annual Meeting of the California Association of Engineering Geologists at Berkeley on October 13-15. After U.S.G.S. geologist Edgar Bailey presented the latest ideas on the depositional environment of the Franciscan rocks and Julius Schlocker described its field expression of the altered and deformed formation, William I. Gardner, followed by other engineering geologists and engineers from federal and state agencies, discussed (or shall we say wailed and complained) about the tunneling, dam foundation, landslide, quarrying and construction materials aspects of the Franciscan rocks.

A program of eight papers on subjects ranging from Colorado highways, ground-water pollution in a rapidly urbanized area near Sacramento, and the control of landsliding on the Panama Canal was presented the first day.

The main point of the business meeting was the recommendation of the Committee on Professional Ethics, Practices, and Registration that the Society investigate and take action toward eventual legal registration or licensing of engineering geologists. This decision was made after a year-long program to review the pros and cons of registration and a poll of the membership. Another highlight of the meeting was the annual banquet address by Harvey O. Banks, Director of the State Department of Water Resources on "The Relationship of Geologists and Engineers in Planning Public Works Projects." Mr. Banks spoke from experience, since the organization he heads employs 85 geologists teamed up with more than 800 engineers, economists, and other specialists. He urged the "integrated geologist-engineer relationship" or "team-approach" to the engineering geologists and encouraged more joint activities with the engineering societies.

Field trips on Sunday in splendid fall weather to the U. S. Corps of Engineers' model of San Francisco Bay at Sausalito, typical Franciscan formation sections south

of San Francisco, and the Lafayette Tunnel No. 2 and the Briones damsite in the Berkeley Hills topped off a highly successful meeting. At the Briones damsite poorly consolidated late-Tertiary continental and marine strata were found tossed together in the usual thrust-faulted and up-ended Coast Range fashion, and many of the 30 geologists that followed Burton Marliave on this trip left with the feeling that maybe the Franciscan was not so bad after all.

The attendance of engineers from several cities in Northern California, as well as many geoscientists, particularly at the Franciscan symposium at which about 250 were present, was highly gratifying to the youthful Society.

Mr. Robert T. Bean (California State Department of Water Resources, Sacramento) succeeded Bruce M. Hall (U. S. Corps of Engineers, Sacramento) as President. Other 1961 officers installed were Vice President Burton H. Marliave (Consultant Geologist, Walnut Creek), Secretary Ira E. Klein (U. S. Bureau of Reclamation, Sacramento), and Treasurer William C. Ellis (Consulting Ground Water Geologist, Sacramento).

Information on the California Association of Engineering Geologists can be obtained by writing to C.A.E.G., P. O. Box 1464, Sacramento 21, California.

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## Gulf Official Predicts Expanded Gas Exploration

At a Fall meeting of the Independent Natural Gas Association of America, David T. Searls predicted that there would have to be a greatly accelerated program of exploration, discovery and development if the natural gas demands of the 60's are to be met. Mr. Searls, Vice-President and General Counsel of Gulf Oil Corporation estimated that drilling of 625,000 new wells would be required in the 1960-70 period to satisfy the demand. He predicted that 220 trillion cubic feet of gas would be needed in the present decade, of which 205 trillion must be developed from U.S. sources. He estimated that the cost of seeking, developing and producing the necessary gas will require expenditures of more than 92 billion dollars. Mr. Searls proposes that a committee, representative of consumers, distribution companies, transmission companies and producers be formed to survey all facets of this problem and to seek a sound basis for adequate expansion of the gas industry to meet the predicted needs.

# AAAS MEETS IN NEW YORK CITY

When the American Association for the Advancement of Science meets in New York City, December 27-30, Section E, Geology and Geography will have a program that will run the gamut from inner space (urban renewal problems) to the inner fringes of outer space (selenology).

In addition to the Section E program, the geological sciences will also be represented in a symposium on *Science In Communist China* which will be sponsored jointly by the AAAS and the Conference on Science Communication with the cooperation of 10 national scientific and engineering groups including AGI on December 26 and 27, aided by a grant from the National Science Foundation. The purpose of the symposium is to obtain an over-all assessment of the state of science and engineering in Communist China. Two participants on the roster of symposium speakers are appearing under the auspices of the American Geological Institute. They are Dr. Edward T. Chao of the U. S. Geological Survey and Dr. K. P. Wang of the U. S. Bureau of Mines who will report on the progress of the Chinese scientists in geology, mining and metallurgy based on a survey of recent Chinese scientific literature. It should be noted that Dr. Chao is a member of the AGI Advisory Committee on Translations. Several translations of Communist Chinese geological literature have already appeared in AGI's *International Geology Review*.

The Section E program has been developed by Program Chairman A. John Haworth of American Overseas Petroleum Ltd., aided by Charles C. Morrison, Jr. of the American Geographical Society, coordinator for the geographic program. There will be a total of 88 papers in addition to the Section E Vice-Presidential Address "*Mineral Raw Materials in the National Economy*," which will be presented by Howard A. Meyerhoff at the annual smoker.

The selenology symposium will bring together reports on both governmental and private research on the moon's surface, especially from the geological and topographical points of view. The Mohole symposium, presented at the AAPG meeting last spring, will be staged again for the AAAS audience with additions resulting from the work of the last six months. A symposium on frontiers in the earth sciences will bring together both general and specific papers on recent developments in both pure and applied geology and related fields.

Registration and housing reservation coupons will be printed in Science weekly until Christmas.

## SECTION E PROGRAM

### Tuesday, December 27

- 9:00 A.M. Palynology (arranged by Calvin J. Heusser)  
Moderne Room, Belmont Plaza Hotel
- 9:00 A.M. Contributed papers in geography, I: Baroque Room, Belmont Plaza
- 1:30 P.M. Cave mineralogy (arranged by William B. White)  
Blue Room, Belmont Plaza
- 2:00 P.M. Late Pleistocene Events in southern South America (arranged by Charles C. Morrison, Jr.)  
Moderne Room, Belmont Plaza
- 2:00 P. M. Soviet geography (arranged by Theodore Shabad)  
Astor Gallery, Waldorf Astoria
- 8:30 P.M. Vice-Presidential Address and Smoker  
Moderne Room, Belmont Plaza

### Wednesday, December 28

- 9:00 A.M. The Urban Frontier: a Conquest of Inner Space (arranged by Charles C. Morrison, Jr.)  
Grand Ballroom, Roosevelt Hotel

### Thursday, December 29

- 9:00 A.M. Frontiers in the Earth Sciences and  
2:00 P.M. (arranged by A. John Haworth)  
Moderne Room, Belmont Plaza
- 9:00 A.M. The New York Metropolitan Region of the Future (arranged by the Regional Plan Association, Inc.)  
Jade Room, Waldorf Astoria
- 2:00 P.M. Economic Development and Investment in Africa South of the Sahara (arranged by Leonard Tow)  
Jade Room, Waldorf Astoria

### Friday, December 30

- 9:00 A.M. The Mohole (arranged by Harry S. Ladd)  
Moderne Room, Belmont Plaza
- 9:00 A.M. Contributed papers in Geography, II  
Jade Room, Waldorf Astoria
- 2:00 P.M. Programming the Use of Natural Resources (arranged by Leonard Zabler)  
Jade Room, Waldorf Astoria
- 2:00 P.M. Selenology (arranged by Arnold C. Mason and L. W. Leroy)  
Moderne Room, Belmont Plaza

## GEOLOGY

### NOT in the news

a report by  
John Eliot Allen

Only one half of the twenty science news writers from as many papers scattered across the United States, indicated that they knew the name of a geologist to whom they could go for information or for checking a news story. The total circulation represented by this group is probably over ten million; and although science news writing is a comparatively new field, many of these writers have been at it for several years. Most of them work only part time on science, but are anxious to report science news correctly and rapidly.

The show of hands was called for by a representative of the AGI, who attended the Science News Writing Seminar conducted September 12 to 17 by Colorado State University, in association with the Denver Post and the National Bureau of Standards under a grant from the National Science Foundation. The chief subject for discussion by the assembled writers and scientists was the relationship existing between these two fields. Physics and chemistry were represented mostly by members of the various Boulder laboratories of the National Bureau of Standards; biology was represented by a panel largely from Colorado State University. Geology was represented by John M. Parker, chief geologist and director of the Denver Division of Kirby Petroleum, the AGI by John Eliot Allen, professor of geology at Portland State College, Oregon.

Scientists conducted two all-day field trips to projects of the Boulder laboratories, and discussions on the philosophy of general scientific research, on biology and soil and water research. Outstanding news writers discussed science news writing as opposed to science writing, both groups engaged in sometimes heated discussion concerning the lack of communication and understanding of each other's problems. Large fields of agreement were achieved, however, before the week's end, and the ideas transmitted and the friendships made will be of value for a long time.

News writers pointed out many of their own problems, emphasizing the constant difficulty of presenting abstractions in terms the public will read and understand. Frequently they must choose between "incomprehensible accuracy" and "comprehensible inaccuracy." The use of metaphor and

analogy, while valuable and frequently necessary, is sometimes dangerous. The writers asked that the scientist be prepared to assist in the following ways:

1. Be willing to cooperate and spend some time with the writers.
2. Be able and willing to translate technical jargon, at least to the science writer, who is frequently familiar with much of it.
3. Understand the problem of time-pressure, which nearly always faces the newspaper man. A visit to a newspaper office was recommended as a great help in this understanding.
4. Understand the kind of public that the writer is trying to reach, and help the writer devise methods of interesting them.
5. Try to do more popular and semi-popular writing themselves.
6. Recognize their own responsibility to help keep the public informed, to help in the educational crusade.

It was quite apparent at the meeting that geologists as a group have had very poor public relations with news writers. With perhaps the exception of oceanography (Ewing and Iselin) and geophysics (Wilson, Brown, etc.) we have few writers that attempt to interest the public in what we are doing. Probably the most important way to correct this would be for geologists in every community to find out who the science writers (or reporters interested in science) on the local papers are, get acquainted with them, and give them a list of the geologists upon whom they can call for information and checking when a science story breaks.

The following list of news writers attended the conference, and have expressed themselves as eager to meet geologists in their areas. Why not make a special attempt to get in touch with them?

#### ARIZONA:

Phoenix, Julian DeVries "*Phoenix Republic and Gazette*"

#### COLORADO:

Denver, Gene Lindberg "*The Denver Post*"  
William Fleming, Free lance writer  
Littleton, Houston Waring, "*Littleton Independent*"

#### IDAHO:

Idaho Falls, William P. Rosenthal, Argonne National Laboratory  
Boise, Rick Raphael, KBOI-TV

(Continued on page 31)

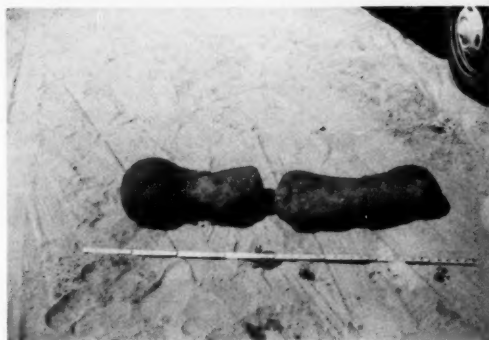


## Large Miocene Whale Found Near Hampton, Virginia

The Smithsonian Institution and the U. S. Geological Survey last summer excavated what may be the largest fossil whale skeleton ever found. The discovery was made by W. M. Rice of Hampton, Virginia, in his borrow pit, and was reported to the Smithsonian by George Webb, president of the Hampton Rock and Mineral Club.

Nicholas Hotton III, Associate Curator, and Kurt F. Hauschildt, artist and preparator, both of the Smithsonian, and Frank C. Whitmore, Jr., of the Survey were sent to Hampton to excavate the skull, which was all that had been uncovered at the time. This turned out to be just the beginning; a nest of vertebrae and ribs was uncovered near the skull and, while these were being dug up, the shoulder blade and all but the smallest bones of one flipper were unearthed. Fifteen vertebrae were collected: the largest measured 36 inches from side to side, and the vertebrae alone filled the back of a half-ton carryall. The last find, which almost broke the paleontologists' backs, was the lower jaw, which measured 11½ feet in length and was 18 inches high at its largest part.

The skeleton came from the upper part of the Yorktown formation (upper Miocene) and was associated with a rich invertebrate fauna including branching coral clusters two feet in diameter. Many barnacles and some encrusting corals and molluscs were attached to the bones in



### Above

Skull, with upper jaw projecting toward camera. The upper jaw was bowed upward (hence the name "bowhead whale"); in this specimen the bones of the upper jaw have broken from the skull, split apart, and come to rest on their sides. Left to right: Hotton, Whitmore, Hauschildt. Photo by David T. Lowe.

### Above Left

Hotton and Hauschildt examining a cluster of ribs (foreground) and the shoulder blade, with hammer lying on it. Photo by David T. Lowe.

### Below

Humerus and radius (upper and lower bones of flipper) with 6-foot rule for scale. Photo by David T. Lowe.

growth position. The find is significant because heretofore only fragments of bone have been found in the Yorktown.

The whale, which was about 50 feet long, was related to *Balaena*, the modern right whale, and on first examination seems to resemble it very closely, which is surprising in a whale of such antiquity. Its skull was about twice as long as that of the largest whale previously found in the East Coast Miocene.





# LETTERS

DEAR EDITOR:

Dr. Charles C. Bates of this Agency has brought to my attention an editorial error in the statement on Project VELA found on page 22 of the September 1960 issue of *GEO TIMES*. I believe the statement is based essentially on a letter from Dr. Bates to Dr. Moore, President of the American Geological Institute, dated 22 July 1960.

Specifically, the Joint Committee on Atomic Energy of the United States Congress is referred to in *GEO TIMES* incorrectly as the ARPA-AEC Joint Committee. Should any questions arise over this inaccuracy, we wished to make it clear that the committee in question is a Congressional committee.

Thanks very much for your cooperation.

Sincerely yours,

LEE W. HUFF

Advanced Research Projects  
Agency ARPA

\* \* \*

DEAR EDITOR:

I have been disappointed that more space in *GEO TIMES* has not been devoted to finding jobs for those geologists who have graduated during the past three years. Having spent two months in the fall of 1957 and one month during the fall of 1959 looking for a job, I know that ideas and encouragement are appreciated.

I am currently employed in the rocket industry as a technical writer, a field I was not aware of until shortly before I got the job. There is presently a big demand for technical writers in the defense industry, because the military requires extensive reporting on all phases of government contracts. Since there is also a big demand for engineers, most of the technical writing vacancies are presently being filled by English majors, journalism majors and other non-technically trained people. A geologist is very well qualified for this type of work because of his general scientific background and experience in dealing with scientific problems. I am sure that if geologists were aware of the openings in this field and were willing to sell employers on their qualifications, numerous jobs would be open to them. The company I work for has hired 3 geologists as technical writers since they hired me 9 months

ago. I am sure that by doing so they have hired more geologists than any other company in the state of Utah during the past two years.

Salaries for technical writers are equivalent to or better than those paid geologists in the oil industry. The work is challenging and gives a person a good opportunity to develop a feel for writing and organizing ideas. It is fairly easy to get into engineering or other phases of the defense industry once a person has established his ability in one phase of it. Also the experience gained as a technical writer should prove very valuable in geology when exploration increases to the point that there are jobs in geology.

Sincerely,

BARD A. MERRITT  
Salt Lake City

---

## NSF Fellowship Awards

Alan H. Cheetham and Dale C. Krause were two earth scientists among 40 scientists to receive National Science Foundation Postdoctoral Fellowship Awards in October.

Krause, an oceanographer from the University of California at La Jolla, will study at the New Zealand Oceanographic Institute. Cheetham, from the Department of Geology at Louisiana State University, will spend a year in study at the British Museum of Natural History.

---

## Linear Strain Seismograph

A special linear strain seismograph to measure the expansion and contraction of the earth's crust has been installed in a New Jersey Zinc Company mine three miles south of Franklin, New Jersey by the Lamont Geological Observatory. The installation when complete will involve two horizontal component instruments and a third vertical instrument. The instrument is of a type designed by Hugo Benioff and utilizes a 200-foot cylindrical quartz rod two inches in diameter, one end of which is attached to the earth. Small slings spaced 10 feet apart support the rod and devices on the floor detect motion.



# GEOLOGY



by

Robert L. Bates

Department of Geology, Ohio State University

As everyone must know by now, last summer the Boy Scouts held their Golden Anniversary Jamboree near Colorado Springs. Among the items that brought geology to the attention of these junior laymen, or layboys, were an 8-page booklet stressing mineral conservation, samples of Climax molybdenum ore and Colorado oil shale, and page 42 of *Boys' Life* for July. This last is a comic-book-style description of the Front Range, by Harry Osborne with an assist from Chalmer Cooper. . . . Those of you who go in for comic books will be interested in *The History of Natural Gas*, by the N. G. Association. Geology and geophysics get 2 of the 16 pages and are presented in reasonably authentic and matter-of-fact form.

Luna B. Leopold and Walter B. Langbein of the U.S.G.S. have come out with the definitive nontechnical report on water. *A Primer on Water*, available from the Govt. Printing Office for 35 cents, is an admirable piece of work for two reasons: (1) it covers the whole subject, the complex along with the simple; and (2) its style is colloquial and friendly without being cute or whimsical. The explanatory notes at the front, for example, are not headed Introduction, Foreword, or Preface, but simply Why This Primer Was Written. Part 1, on Hydrology, covers such topics as the causes of rain and snow; water in the ground; the meaning of artesian water; streamflow and the river channel; floods; and soil erosion. Part 2, Water Use and Development, discusses, among other subjects, city water systems, irrigation, flood control, and water conservation. There are 16 line drawings, some with blue overprint, to which the discussion is well keyed. The water table is first explained by reference to a figure showing sand and water in a dishpan, and then by description of the real conditions underground. Surface runoff, groundwater storage, streamflow—all are lucidly presented. Throughout, one feels that he is in the hands of authorities who are also interesting human beings. A rare combination. Prospective authors of physical-geology texts could well use *A Primer on Water* as a model. So could writers of geological reports for the general public.

## SEISMIC CELEBRATION

The 50th Anniversary of Fordham University's Spain Seismic Observatory will be observed by an all-day symposium at the University on December 10, 1960. Focusing on current major problems and anticipations for the future, the symposium will present six speakers, including Dr. Frank Press, Dr. Maurice Ewing, Dr. Leonard Murphy, Dr. Bartholomew Nagy, Rev. William Stauder, S.J., and Rev. Henry Bilken, S.J. Fordham's well-known seismologist and director of the Seismic Observatory, Rev. J. Joseph Lynch, S.J., is planning the program and will provide tickets to interested people.

## GEOLOGY NOT IN NEWS

(Continued from page 28)

### KENTUCKY:

Louisville, Dennis Blakeslee, "*Louisville Times*"

### MICHIGAN:

Detroit, Jack Pickering, "*The Detroit Times*"

### MISSOURI:

Kansas City, Robert P. Sigman, "*Kansas City Star*"

### NEW MEXICO:

Los Alamos, Mrs. Peggy Corbett, "*The New Mexican*"

John V. Young, Los Alamos Scientific Laboratories

### NEW YORK:

New York, Richard Slawsky, "*New York World-Telegram and Sun*"

### OKLAHOMA:

Tulsa, George Gravley, "*The Tulsa Tribune*"

### PENNSYLVANIA:

Pittsburgh, Werner Siems, "*The Pittsburgh Press*"

### TEXAS:

Austin, Miss Marjorie Wightman, "*The American Statesman*"

Dallas, Miss Helen Bullock, "*Dallas Morning News*"

Houston, Ralph S. O'Leary, "*The Houston Post*"

Fort Worth, Blair Justice, "*Star Telegram*"

### UTAH:

Salt Lake City, Merwin G. Fairbanks, "*Desert News*"

### WISCONSIN:

Madison, Mack Liang, Science News Service, U. of W.

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or a Soviet field  
geologist sees red

"There are many stories about geologists, their life and habits and about ordinary and extraordinary happenings. Romance and adventure stand foremost in such productions but the endings are not distinguished variety: the story always ends in a discovery of a large deposit of some mineral raw material.

"No doubt, there is much romance in the work of an exploration geologist. Long hikes, nights by a campfire, mountain streams, dense forests, stumbling on something valuable, —all this is a guerdon of unforgettable memories and joys for anyone who can have them.

"However, geologic exploration has its own sore spots and unsolved problems of which people speak little and unwillingly for some incomprehensible reason. Perhaps people just do not understand them and the naturally modest geologists do not mention them. And yet some of these things are indeed worth talking about.

"Geophysics is becoming progressively more important in our work. Novelties in geophysical equipment are propagandized intensely at professional meetings and in technical magazines. Their procurement, however, is far from easy. Thus not a single piece of new geophysical apparatus was received by us in three years, here in Verkhoyan'ye. As a rule, we cannot even replace our worn-out and obsolete apparatus by another one, be it just as obsolete. Naturally, there is no use talking about enhancing the role of geophysics; we can barely make it hold its own, the way it is.

"The airphotos are another problem. Their use in geologists' equipment is pretty old. It is difficult to imagine now a geologic map that could be made without the aid of airphotos. And yet geologic maps do have different scales. Consequently, aerial survey too must be made on different scales. All we've got is an assortment of

<sup>1</sup> From *Ekonomicheskaya Gazeta* (Economic Gazette), June 8, 1960, p. 3, "Ne tol'ko kostry i pikhody—" ("Not only campfires and campaigns—"), by A. Borodyanskiy, Chief Geologist, the Yana Regional Geologic Administration. Translated by V. P. Sokoloff, September 7, 1960.

low magnification airphotos and we have no mosaics and no apparatus for transferring airphotos onto a topographic base.

"A comprehensive examination of test materials is essential during summer seasons in the field. This requires a laboratory manned by a competent staff and equipped with appropriate apparatus. Such laboratories exist indeed, in Moscow, Leningrad, and other cities. When it comes to Yakutia, however, where the geologic exploration is being carried-on on a rather considerable scale, there is no opportunity at all for determining the age of rocks, of making professionally competent paleontological identifications, or of conducting preliminary technological tests. As to the central laboratories—they deal with our work-orders with an astonishing procrastination.

"The low quality of equipment is a standing grudge of geologists. Be the romance ever so romantic, one has a natural tendency to hide in a waterproof tent when it rains. Our journalist visitors never fail to observe torn trousers of a geologist, but it is really rough when the soles of our boots fall off after a few days of wear. The pack-horse harness is so rotten that it is not safe to ford rivers. . . . A list of such nuisances could be extended, although it is perfectly clear, the way things are, that we must demand at last the execution of the superabundant orders to the effect that geologic parties in the field must be given a satisfactory equipment.

"A fine geologic team is living and working in the Far North, at the headwaters of the Yana River. Builders and miners will follow geologists before long, in order to develop the mineral wealth of this country, in the service of our nation. No hardship is great enough to daunt the Soviet folks who had dedicated themselves to the noble task of developing these distant but still "ourn" territories. What is the purpose then of providing additional obstacles to the Pioneers?"

A. Borodyanskiy, Chief Geologist  
The Yana Regional Geologic Office  
Batagay Village, Verkhoyansk District, Ya S  
SSR

## Pan-Am Fellowship

Frederick N. Murray has been awarded the Pan-American Petroleum Foundation Fellowship in Geology for graduate study at the University of Colorado. Murray is the son of Professor Albert N. Murray, recently retired head of the Department of Geology at the University of Tulsa.

## Sigma Xi Grant

D. B. Slemmons, Professor of Geology at the Mackay School of Mines, University of Nevada, has received a grant from the Society of Sigma Xi, Scientific Research Society of America for a research project on the optical and structural nature of high and low temperature feldspars.

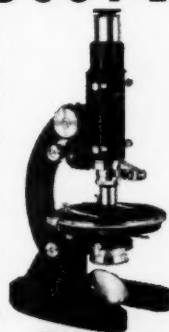
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## MANPOWER in a column -

By HOWARD A. MEYERHOFF

Scientific Manpower Commission  
1507 M Street, N.W., Washington 5, D. C.

Seems like everybody's going to Russia. Here in Washington, it has almost reached the point where some stigma is attached to anyone who must admit he hasn't been there. Whether it is a reflection on his professional stature, or on his inability to tap government funds for a free ride, is problematical.

Teams of educators, physicists, industrialists, etc., etc., have all toured the Soviet Union. Only the geologists appear to have lost out in the procession of pilgrimages.

One of the latest groups to go was a team of engineers that journeyed under the auspices of Engineers Joint Council. It was a group carefully chosen to observe the wide range of activities associated with the recruitment, education, and utilization of engineering and technician personnel. Some of their preliminary comments are worth recording.

During the past academic year, the USSR graduated 108,000 engineers. Most of them, however, were narrowly trained in industrial specialties—not in the broader aspects of engineering.

Approximately one third of the students in the engineering and technical institutes are women, and this ratio holds in engineering employment.

The technical institutes, called "technicums," are turning out 250,000 engineering technicians a year—we graduate approximately 15,000. Despite the narrow specialization, the theoretical and mathematical content of the curricula in the engineering and technical institutes exceeds that of comparable curricula in the United States.

Perhaps it is good that no geological team has yet visited the USSR, for it might discover that training in the earth sciences there is far more rigorous than the training given in many of our colleges and universities. Such a team might also discover that the Russians have several thousand field parties working on Soviet geology and that progress in geophysics is on a par with that in the U.S., whereas geochemistry has pulled far ahead.

Discoveries of this kind might be discouraging at a time when earth scientists here are being fired, rather than hired; and when no one seems concerned about put-



## ROCK CHIPS

by SANDSTONE SAM

*The less one does, the less time one finds to do it in. Karpinson's Law.*

• • • • •

Q. Explain the Law of Superposition.

A. The Law of Superposition is simply the replacement of the various minerals by other minerals with the fact in mind that once a substance is extinct, it will never appear again.

• • • • •

Student: "The last period of the Mesozoic is the Crustaceous".

• • • • •

Geologists and geophysicists who take oil finding seriously and themselves even more seriously might prefer to pass up the article "How to Strike Oil Without Trying" which appears in "Doodles" published by Herb J. Hawthorne, P. O. Box 7366, Houston 6, Texas.

• • • • •

Ford Times, August 1960, p. 38 in describing the Malibu Beach clams and how to clean them said this, "The best method is to pick them carefully from the bucket of sea water while they are still partially open and quickly insert a thin-bladed knife into one end and sever the abductor muscle."

• • • • •

Student: "The Burlington Limestone is full of noodles of chip rock."

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ting their talents to use in extending the knowledge of domestic resources, earth science technology, and geophysical and geochemical theory and instrumentation.

Guess we'd better stay home.

# INTERNATIONAL STUDY OF EARTH'S CRUST

a report by  
G. C. Amstutz

In 1952, at the International Geological Congress in Algiers, a number of geologists interested in the problems of the deeper metamorphic zones of the earth's crust gathered and formed a team or association. The aim at that time and still today is, to compare the methods and results of investigation in this one field of common endeavour. It was suggested, and followed since, to exchange information among the members and to organize every year, except normally during the years of the International Geological Congress, a field trip of 8-10 days in a conveniently located area, and where advanced research has led already to a synthesis of results. The problems which are being discussed centered on the tectonics and petrology of the crystalline schists, including investigations of all scales and numerous methods.

So far, three field trips have been successfully completed: in 1956 in the Precambrian of South Norway, led by the Professors Barth of Oslo, Bugge of Trondjem, and Michot of Liège; in 1957 in the Caledonides of Scotland, led by the Professors Anderson of Cardiff, and Wilson and Sutton of London; in 1958 in the Massif Central of France, led by the Professors Roques and Lapadu-Hargues; in 1959 in the metamorphic rocks of the Vosges in Eastern France, the Black Forest of Germany and the Odenwald, led by the Professors Jung of Paris, Millot and von Eller of Strassburg, Mehnert of Berlin, and Tröger and Wimmenauer of Freiberg i.B.

The next meeting will take place in 1961 in Eastern Germany, as proposed at the 1959 meeting and decided definitely at the meeting of the Association during the International Geological Congress in Copenhagen. It will be organized by the Professors Watznauer of Berlin and Zoubek of Prague. The program will consist of the study of a cross section of Precambrian areas from Leipzig to Prague (and possibly in 1963 from Prague to Vienna). Tentative plans are also made to hold the 1962 meeting in Russia, following an invitation by Russian geologists.

The Association has some 100 members and is open to anyone who takes an active interest in the problems mentioned above. The participation in field trips is not re-



**New Science Building** on campus of Western Washington College of Education, Bellingham, Washington is to be dedicated in early December. The building houses the department of geology, physics and chemistry, and biology. The geology department has laboratory facilities in geology, geophysics and geochemistry. The staff of the department includes Marie Pabst, Donald Easterbrook and Robert A. Christman, Chairman.



**New Orleans Geological Societies'** new officers are pictured above. From left to right in the front row are Leonard L. Limes, Kerr-McGee Oil Industries, Vice-President, Jules Braunstein, Shell Oil Company, President, and L. W. Funkhouser, The California Company, Director. At the rear are, left to right, Jack D. Cox, John W. Mecom, Treasurer, and David N. Schell, Superior Oil Company, Secretary. These men took office at the October meeting and will serve the society through September, 1961.

stricted to members, and it is hoped that, in the future, the activity of the Association will extend to both Americas, where numerous geologists have made important contribution to the knowledge of the Precambrian terrains. Applications may be sent to the Secretary of the Society, *Prof. Jean Michot, Université, Liège, Belgium, or to G. C. Amstutz, University of Missouri School of Mines and Metallurgy, Rolla, Missouri.*

## OCEANOGRAPHY

(Continued from page 18)

North and 20° South latitude, continental shelf to continental shelf. Hydrological information in this area is moderately plentiful. The primary objective will be to do precise bathymetric work with close navigation control. Grid spacing of 15 kilometers is recommended. Soundings should be made by Precision Depth Recorder, a continuously recording magnetometer should be used and possibly shipboard gravimeters should be employed. Other observations which can be made from a ship continuously underway will also be taken. The limits of the area to be surveyed will be gradually increased but at first the trans-Atlantic grid should begin at about 30° North and work to the South."

### SOUTHEAST PACIFIC

A second area recommended for immediate attention is the Southeast Pacific. "In the region bounded by Juan Fernandez, the Cook Islands, 50° South and the Equator, only half-a-dozen expeditions, reconnaissance in nature, have crossed the area in the last 75 years. Adequate navigational charts are available for only the coastal areas. Only in the last 15 years have continuously-recording echo-sounders yielded significant data from this area. The grossest features—the Peru-Chile trench, the East Pacific Rise and the Society and Tuamotu Ridges—have been noted, but hardly delineated. Recent exploration reveals the existence of guyots or flat topped seamounts and a great east-west mountain range, the Sala y Gomez Ridge, that bisects the basin and certainly affects the deep water circulation."

"The East Pacific Rise, which extends from Antarctica to the Coast of Central Mexico, is characterized by high seismicity and high values of heat flow upward through the crust. Apparently this unstable region is the near-surface expression of forces, acting deep within or beneath the crust, which are active in the shaping and evolution of continents and ocean basins.

"Hence, we propose that a survey be made at the earliest opportunity of the region bounded on the west by 170° West, on the North by 20° North, and the east by 120° West (North of the Equator) and the South American coast (South of the Equator) and on the south by 50° South. Perhaps this area should be explored in two separate surveys, one emphasizing sounding and hydrographic measurements and the other, possibly carried out concurrently, employing in varying degree the tools and techniques of modern marine

geophysics: precise echo-sounding, towed magnetometers, surface gravimeters (if possible) heat flow measurements, possibly seismic-refraction measurements, bottom-photography, bottom-coring and dredging, mid-water and bottom trawling for organisms.

"Because the South East Pacific is so poorly known even with regard to some of its largest features the initial work here should be of a reconnaissance nature, departing from the usual plan suggested for oceanic surveys. It is also a region which today does not have and may not have in the near future, a means for establishing precise positions. We propose that this area be surveyed by underway lines 100 km. apart with a position of 3 km. (celestial navigation.) Hydrographic stations should be taken along every fifth line at 100 km. intervals. The total area is about 60 million square kilometers and the total number of hydrographic stations about 1000. We estimate that this survey will require 2,600 ship days or 13 ship years."

### INTERDISCIPLINARY ATTACK NEEDED

Obviously, plans and objectives of so broad a nature will require the cooperation of many scientists, particularly geologists and geophysicists. Although a relative handful of geophysicists have devoted their careers to marine research in the past, this number will surely increase.

Perhaps one of the strongest encouragements for further attention to geophysical marine problems has been the recent Navy Department declassification of bathymetric soundings. These soundings, most of them previously classified confidential, are now for the most part declassified thanks largely to a review of the need for security classification in this field encouraged by the Committee on Oceanography. The new classification policy on oceanic soundings, promulgated by Chief of Naval Operations Instruction 3160.6A of 20 January 1960, specifies that sounding information, charts, collection sheets and other means of portraying ocean depths shall be unclassified where the method of position location of the data is by conventional navigational means such as plotting, navigational radar, celestial, Loran-A, or dead reckoning. This means in effect that all bathymetric data except that taken for very special purposes and involving very high degrees of accuracy in plotting are now unclassified and available at cost from the Hydrographic Office. The wealth of data unleashed by this order should attract the attention of many scientists to problems of marine geophysics.



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INDUSTRIAL-ACADEMIC RELATIONS COMMITTEE of the AAPG, Orlo E. Childs, Chairman, met in Denver during the GSA meeting to discuss its program. Pictured above at this meeting were (left to right) E. N. Goddard, M. Gordon Gulley, Michel T. Halbouty, A. J. Eardley, H. T. Morley, Orlo E. Childs, (with back to camera l. to r.) Douglas M. Kinney, F. H. Miller and G. A. Hill.

The committee was appointed by AAPG President Ben H. Parker to consider ways and means of correcting the current imbalance between available employment opportunities in geology and the available supply of geologists.

In a fact-gathering program, the committee is surveying colleges and universities for pertinent academic background data and industry for data on employment practices.

It is the objective of the Committee that the collection of the survey data be completed in January and a preliminary report be presented to the AAPG convention in Denver in April 1961.

**Gordon Atwater**

**is new**

**member of**

**AGI Executive**

**Committee**



Gordon I. Atwater, consulting geologist and member of Atwater, Cowan and Associates of New Orleans, La., was elected vice president of the American Geological Institute at the annual meeting in Denver and becomes a member of the AGI Executive Committee (see page 25). Dr. Atwater holds membership in GSA, AIME, AGU, SExG, and AAPG. He has served AAPG in many capacities and in 1958 was vice president of the Association.

## USSR PETROLEUM

(Continued from page 11)

per day, alkylation units from 1,000 to 2,000 barrels per day. Thus a large output requires banks of parallel units. None of the processing was unique or particularly up to date.

### RESEARCH

We saw only two research institutes, both related to production. As far as we could tell, the researchers were of high quality—a large percentage were women. The equipment seemed barely adequate and the working conditions very crowded. With respect to the auxiliary equipment expected in scientific institutions and laboratories, it was interesting that we saw only one calculator, and that one was handcranked; but every desk contained an abacus. The work being done was on an applied level adequate for their needs. The problems in the USSR with respect to production are much less than is the case in the United States because the Soviets are disinterested in reservoirs that are not large and relatively uniform with respect to permeability and porosity.

### ECONOMICS

To most of the individuals and groups encountered, this word simply meant the degree of adherence to the seven-year plan. Cost allocations and pricing are arbitrary and may bear little relationship to each other. However, with respect to exporting crude and products both our hosts, The State Scientific and Technical Committee and The Soviet All Union Corporation for Oil Export did their best to assure us that Soviet actions would be in accord with good business practice, that the intent would be to obtain for their oil something of equivalent or greater value to them. To the extent that a fair return could not be obtained, they were prepared to step up that much the consumption of petroleum products at home. Since the per capita use of petroleum products in the USSR and its satellites is quite low, this sounds plausible; it is certainly possible. The point we cannot afford to overlook is that it is equally possible for the Soviets to dump their excess if it suits the purposes of the small, ruling group; the two hundred odd million people outside of the Communist party have nothing to say about this. As a matter of fact, most of the 7 or 8 million Communists have nothing to say about it either.

### SOME GENERAL OBSERVATION

- The people in all walks appear cheerful, well fed, satisfied. What they have now is better than what they had last year, and they feel this trend will continue.
- The immediate impression on a North American with respect to almost everything is one of drabness, shoddiness. Clothes are shabby; new apartment buildings show cracks; roofs leak; plumbing inadequate, awkward or absent; stores crowded; etc. On the other hand, a look at the 1,000 acre Permanent Exhibition of Science and Industry on the outskirts of Moscow, a look at the magnificent subways, at their jets, a ride in one of their large hydrofoil boats on the Volga, a look at the hydroelectric plant at Stalingrad, awareness of their prowess in rocketry and nuclear physics makes us realize that what the Communists want to do well will be well done.
- The Soviets have a very high regard for real education, cultural as well as technical. While this is an advantage to them, it may also be of value to us because education makes skeptics.
- The Soviet entertainment habits seem highbrow to us. Even villagers are followers of opera, ballet, the theatre.
- Virtually all the people met seemed genuinely friendly to us as individuals. There were exceptions like the workman in the Red square who said, when he found we were Americans, "Ah, that's where they squeeze the juice out of the worker." But even he smiled when he said it.
- As a whole, the people are frantically for peace. One could start a crowd clapping by shouting the word "Mir." Let us hope this filters up to the top.

### CONCLUSIONS

In making these comments I have tried to be objective. It is not easy. Contrasts were extreme and unpredictable: the air of cheerfulness within a police state, intellectual vigor next to dull acceptance of the 'word,' obvious physical progress surrounded by equally obvious physical decay. It is further interesting to note how quickly some of those contrasts tend to disappear or merge—a matter of a week or two. This suggests that one who wants to be an expert should confine his visit to a few days. I am tempted to sum up my impressions by saying that the total institution looks awkward, inefficient, shabby and quite sturdy.



## Popular Geology in print

Much youngster's fiction dealing with geology is pretty poor stuff, but *Jean Speiser's RIVER IN THE DARK* (John Day Co., 1960, \$3.50) is as realistic and informative a novel as one could want; dealing with cave exploration and cave conservation in Mammoth Cave National Park, this story is fine for the Boy Scout-junior high crowd.

John Wesley Powell's thrilling boat ride down the Colorado in 1869 is told in two books suitable for almost anyone age 12 up. *FIRST THROUGH THE GRAND CANYON* (Winston, 1960, \$2.95), by the well known writer of westerns, *Steve Frazee*, is a thoroughly researched account of the great adventure, as seen through the eyes of the youngest member of the party, 21-year-old Andy Hall, and is written in fictional form. *DOWN THE COLORADO WITH MAJOR POWELL* (Houghton Mifflin, 1960, \$1.95), by novelist-playwright *James Ramsey Ullman*, is more pretentious and less convincing, despite the author's obvious admiration for the Major; numerous maps and pictures.

More for the history of science fans are the following four titles. *Frontiersman James White*, pursued by Indians, built a raft and preceded Powell down the Colorado by two years, says *Richard E. Lingfelter* in his slender volume *FIRST THROUGH THE GRAND CANYON* (Glen Dawson, Publisher, 550 So. Figueroa St., Los Angeles 17, Calif., 1958, \$7.50), and he marshals evidence, old and new, to prove his point; bibliographical notes, but no map. In the same controversial vein is *FREMONT'S FOURTH EXPEDITION, A DOCUMENTARY ACCOUNT OF THE DISASTER OF 1848-1849* (A. H. Clark Co., 1264 So. Central Ave., Glendale 4, Calif., 1960, \$9.50), in which *LeRoy R. Hafen* has assembled a collection of diaries by participants; Fremont's survey came a cropper during the worst snows of a century as he attempted to prove the feasibility of winter railroad operations across the southern Colorado wilderness; maps, illustrations, and bibliographic footnotes. Also edited by historian *Hafen* are *THE DIARIES OF WILLIAM HENRY JACKSON* (A. H. Clark Co., 1959, \$9.50); much of the volume is devoted to the 1873 and 1874 field seasons in Colorado, when Jackson was photographer with Hayden, and his account is crowded with references to

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## Seismological Meeting in March

The annual meeting of the Seismological Society of America will be held on Monday and Tuesday, March 27 and 28, 1961, on the campus of the San Diego State College, San Diego, California. The meetings will be held in conjunction with those of the Cordilleran Section of the Geological Society of America.

Those who wish to present papers should have titles and abstracts of not more than 250 words in the hands of the Secretary, Karl V. Steinbrugge, 465 California Street, San Francisco 4, Calif., by January 14, 1961, so that they may appear in the printed program of the Geological Society of America. If the number of papers to be presented warrants, an additional session will be scheduled for Wednesday, March 29.

Gardiner, Gannett, Whitney, and other old Survey hands. Long out of print but now available again is the first publication to result from the Lewis and Clark Expedition, Sergeant *Patrick Gass'* unpretentious but readable *JOURNAL OF THE VOYAGES AND TRAVELS OF A CORPS OF DISCOVERY . . .* (Ross & Haines, 413 So. Fourth St., Minneapolis 15, Minn., 1958, \$8.75).



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THIS IS THE AMERICAN EARTH, by Ansel Adams and Nancy Newhall, 1960, 112 pp., Sierra Club, Mills Tower, San Francisco 4, Cal., \$15.00.

Truly superb exhibition photographs of American landscapes are accented with brief, but vivid text to weave a story of the scenic splendor of America. A treasured gift of unusual character.

METHODS IN GEOCHEMISTRY, Edited by A. A. Smales and L. R. Wager, 1960, 464 pp., Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y. \$13.50.

A group of eleven scientists of the United Kingdom combine their efforts to describe the laboratory methods for qualitative & quantitative determination of geological materials.

NEW WATER FOR A THIRSTY WORLD, by Michael Salzman, 1960, 210 pp., Science Foundation Press, 73314 Ascot Sta., Los Angeles 3, Cal., \$5.95.

This book, dedicated to Stephan Riess the proponent of "primary water," skillfully lifts a myriad of geologic facts and figures from context to make the author's case for water from deep within the earth as the solution to our water problems.

CLAYS & CLAY MINERALS, Edited by Ada Swineford, 369 pp., 1960, Pergamon Press Inc., 122 E. 55th., New York 22, N. Y. \$8.50.

Contains the proceedings of the sixth annual clay conference (1958) of the Clay Minerals Committee, National Academy of Sciences-National Research Council. The volume contains 24 papers.

STRESS WAVE PROPAGATION IN MATERIALS —an international symposium, 337 pp., 1960, Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y.

Contains an assemblage of papers by 15 outstanding scientists and engineers on various aspects of stress wave phenomena. The papers were presented at a symposium sponsored in 1959 by the office of Ordnance Research in conjunction with Pennsylvania State University.

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FROM THEORY TO PRACTICE IN SOIL MECHANICS, selections from the writings of Karl Terzaghi and others, 425 pp., 1960, John Wiley & Sons, Inc., \$12.00.

Prepared in commemoration of Karl Terzaghi's 75th birthday this volume contains selected writings of Terzaghi on engineering geology and civil engineering with a bibliography and contributions on his life and achievements by L. Bjerrum, A. Casagrande, R. B. Peck, and A. W. Skempton.

THE NATURAL GAS INDUSTRY, by Edward J. Neuner, 302 pp., 1960, University of Oklahoma Press, Norman, Oklahoma. \$5.75.

A study of the background of the controversial issue as to whether or not utility-type regulation should extend to the producers of natural gas. Particularly interesting is Part III, *Monopoly in the Gas Field—An Evaluation*.

A FRENCH-ENGLISH VOCABULARY IN GEOLOGY AND PHYSICAL GEOGRAPHY by G. M. Davies, 140 pp., reprinted 1960 (original edition 1932), John Mann, 5 Hale Lane, Mill Hill, London, N. W. 7, England. \$2.82 including postage.

PHYSICAL SCIENCE, by D. S. Allen and R. J.

Ordway, 825 pp., D. Van Nostrand Co., Inc. 120 Alexander St., Princeton, N. J. \$8.25.

This is written as college-level text for the non-science major with little or no previous background in science and math. The first part is devoted to chemistry and physics and the second part to the earth sciences.

ESSENTIALS OF EARTH HISTORY, by W. L. Stokes, 502 pp., 1960, Prentice-Hall, Inc., Englewood Cliffs, N. J. \$8.75.

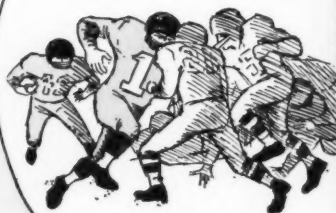
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SPECIFICATIONS FOR A WORLD-WIDE NETWORK OF STANDARDIZED SEISMOGRAPHS, First report by the Committee on Seismological Stations, 8 pp., 1960. National Academy of Sciences-National Research Council, 2101 Constitution Ave., N.W., Washington 25, D. C., free on request.

LIST OF GEOLOGICAL PUBLICATIONS, 1960, Pennsylvania Topographic & Geologic Survey, Department of Internal Affairs, Harrisburg, Pa., free on request.

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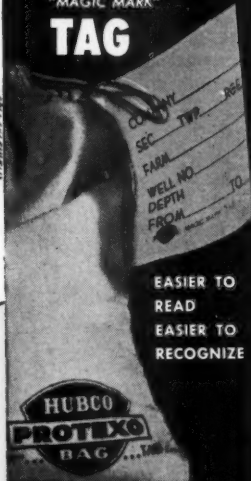
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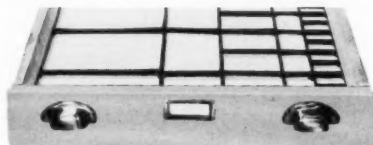
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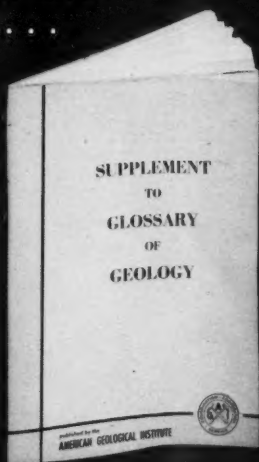
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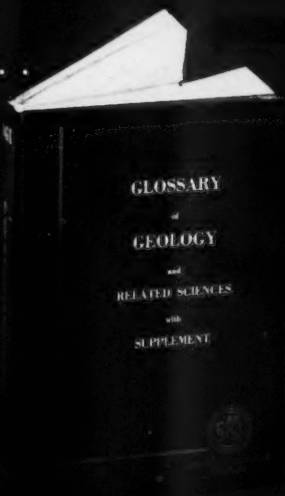


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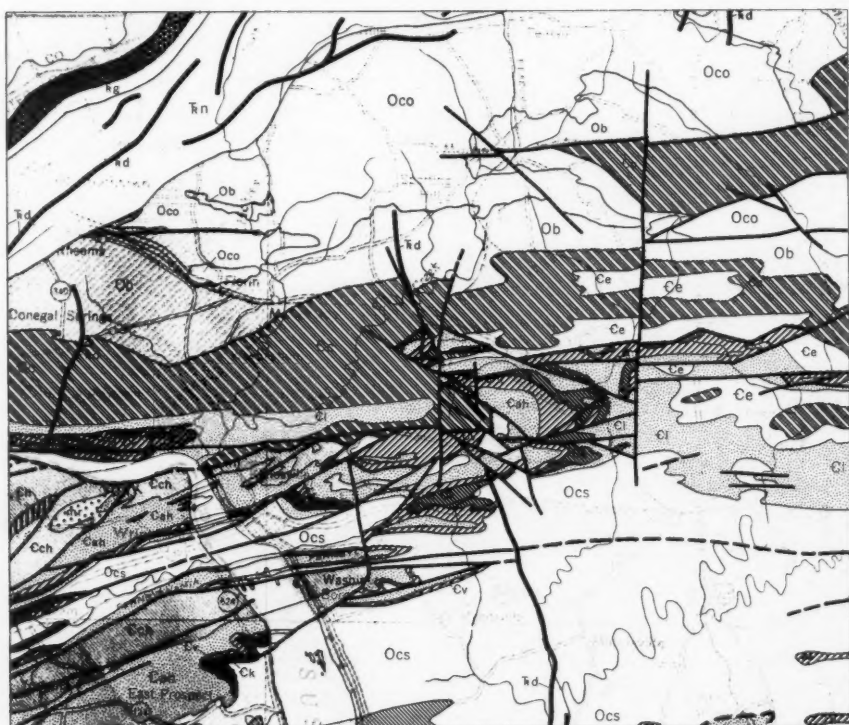
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